JOURNAL

OF THE

Indian Medical Association

VOLUME XXII
NUMBER 8

CALCUTTA
MAY 1953

Indian Medical Association
Central Office,
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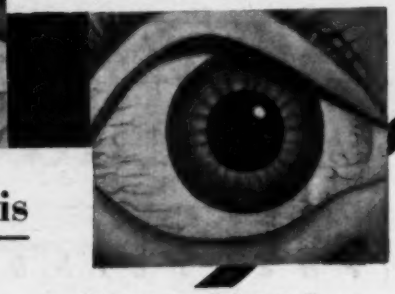

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[1]Scheie, H. G., Tyner, G. S., Buesseler, J. A., and Alfano, J. E., *J.A.M.A. Arch. Ophth.* **45**:301, March 1951.
[2]Leopold, I. H., Purnell, J. E., Cannon, E. J., Steinmetz, C. G., and McDonald, P. R., *Am. J. Ophth.* **34**:361, March 1951.

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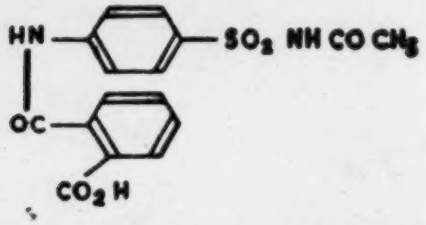

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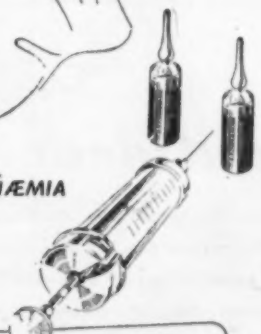

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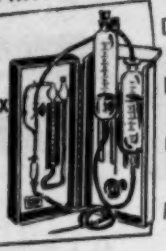

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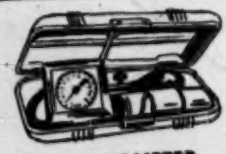

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Journal of the Indian Medical Association

VOL. XXII. No. 8 CALCUTTA MAY, 1953

ORIGINAL ARTICLES

THE CYTOLOGY OF *LEISHMANIA DONOVANI* (LAVERAN & MESNIL, 1903) ROSS, 1903

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The nucleic acids play a very important part in the life process of the cell whether of animal or of plant origin. According to Cohen (quoted by Seshachar, 1952) all non-parasitic cells contain three types of nucleotides, viz., (a) ribose nucleic acid (RNA) associated with cytoplasmic particles, chloroplasts, mitochondria, microsomes and also with nucleolus of the nucleus; (b) desoxyribonucleic acid (DNA) found associated with some nuclear structures, e.g., chromatin of the chromosomes; and (c) ribose-5-phosphate nucleotides existing as various coenzymes necessary for a number of metabolic reactions. It has been said that an organism that has lost this last type of nucleotides is an obligate parasite. It is, however, possible that the nucleic acids of different organisms or tissues may be different, but there exists an underlying basic pattern of chemical structure between them.

It appears that there is very little detailed knowledge about the nucleic acids of protozoa (Seshachar, *loc. cit.*). According to Lillie (1948) the chromatin of plasmodia, sarcosporidia, toxoplasmata are Feulgen positive (i.e. contain DNA). Of the trypanosomes, trophonuclei of *T. cruzi* in its leishmania form stain as deep purple rings (Feulgen positive), but the blepharoplasts (? parabasal body) are said to be Feulgen positive in some clusters but not in others. The nucleus of *T. brucei* and *T. equiperdum* may stain with difficulty and blepharoplast may fail to stain, (in blood films fixed with methanol) with Feulgen reaction. Many coccidia (Eimeria) may lack Feulgen-positive material. Some recent work has shown (Seshachar, *loc. cit.*) that the cytoplasm of some protozoa, viz., ciliates, is very rich in RNA and that the micro and macro-nucleus of certain euciliates vary in their nucleic acid content though the essential nucleic acid of both the nuclei is DNA. In the present communication we present the results obtained by our study of the parasite of kala-azar, *Leishmania donovani* by employing certain cytological methods.

MATERIAL AND METHOD OF INVESTIGATION

For the study of the leishmania form of the parasite, smears from spleen or bone marrow as obtained by puncture and histological sections of spleen, bone marrow or liver from cases of kala-azar or biopsy material from cases of post-kala-azar dermal leishmaniasis were used. One of the specimens consisted of the spleen of a drug-resistant case of kala-azar removed surgically.

Leptomonads growing in the water of condensation or on the surface of the media in subcultures of *L. donovani* in N.N.N media obtained from cases of ordinary and 'resistant' kala-azar (by culture of spleen or bone marrow material), were used for the study of the flagellate form of the parasite.

For wet fixation of smears Schaudinn's fixative was most frequently used; only in a few instances Carnoy's and Zenker's fixative were used. For tissues, Zenker, Zenker-formol, and in a few instances Carnoy or formol-saline were employed. All wet fixed smears of leptomonads were first exposed to osmic acid vapour for about two minutes before being put in the fixative solution. Schaudinn's fixative for smears and Zenker's fluid for tissues was found to be very satisfactory for Feulgen and routine methods of staining. Carnoy solution was used for specimens meant to be stained with Unna-Pappenheim stain.

In addition to Leishman or Leishman-Giemsa or May-Grunwald-Giemsa stains of dry smears, sections and wet smears were stained with iron hæmatoxylin according to the method of M. N. De with certain modifications (Sen Gupta, *et al*, 1950). The cytological methods adopted were as follows:

(a) *Feulgen's nucleal reaction*—The method as described by Rafalko (1946) for staining minute or diffuse chromatinic structures was generally used with slight modifications, viz., the leucobasic fuchsin was rendered completely colourless with activated animal charcoal and the sulphurous acid bath as described by Carlton (1938) was freshly prepared each time and used; the time for washing out the unreacted leucobasic fuchsin in sulphurous acid baths was one to two minutes in each bath for thin smears and two to three minutes or more for tissue sections in each of the three baths. Eight to ten minutes were allowed for hydrolysis in N HCl at 60°C. 0·25 per cent light green in 90 per cent alcohol was generally used for counterstaining.

(b) *Methyl green and pyronin stain*—A number of sections and smears were stained with Unna-Pappenheim stain but the results were not uniformly satisfactory, though a number of fairly well stained specimens were obtained. Methyl green (C. I. No. 685) and pyronin B (C. I. No. 741)—National Aniline Divisions, were used individually for staining the flagellates supravitally; this method gave satisfactory results

(c) *Study of the action of ribonuclease (Kunitz) on L. donovani*—The method as described by Snapper *et al* (1947) was adopted for spleen and sternum, tibia or ilium puncture smears containing Leishman-Donovan bodies in large numbers and for dry smears of leptomonads. Incubation at 37°C for 30 minutes caused the basophilic cytoplasm of the plasma cells to be completely digested away showing that the enzyme was quite active. A different method of enzyme action was evolved: 0·04 per cent solution of the ribonuclease was made in sterile citrated normal saline. One loopful of leptomonad culture was placed on each of the two sets of slides, one group for control and the other for enzyme action. Three loopfuls of sterile citrated normal saline were mixed with each of the control specimens and three loopfuls of 0·04 per cent ribonuclease dissolved in the identical saline solution with the test specimens. The slides with the control and test specimens were put in moist chambers at 37°C for 30 minutes and then taken out. Smears were made with a platinum loop, air dried and then both sets were stained with Leishman's stain in identical manner.

(d) *Supravital staining with Janus green and neutral red*—The flagellates were stained in approximately 1: 50,000 to 1: 100,000 solution of Janus green and 1: 20,000 neutral red. The stain was allowed to act for a few minutes and the specimens examined in the living state. The dyes were used singly. Control specimens using normal saline as diluent were also examined.

N B.—Janus green, if too concentrated, stains the parabasal body and at times even the nucleus.

(e) *Supravital staining with brilliant cresyl blue*—The usual method for staining reticulocytes was followed using wet cover slip preparations [Method A (ii) —Napier and Das Gupta, 1941].

Observations

The Nucleus

(a) *Leishmania form or the L. D. body*—With Feulgen reaction, the nucleus of the L. D. body was found to consist of a Feulgen-positive peripheral ring and a more or less central dot like or slightly elongated karyosome; the rest of the nucleus stained with light green. This appearance was seen in both tissue sections and wet fixed smears of splenic or bone marrow smears. Methyl green stained the nucleus in tissue sections, but it was not possible to distinguish the component parts of the nucleus and to satisfactorily stain marrow or splenic smears with Unna-Pappenheim stain. In dry smears subjected to the action of ribonuclease, the nucleus did not appear to be greatly affected.

(b) *Leptomonad form of L. donovani*—The nucleus of the leptomonad form was found to be Feulgen-positive. It appeared to be mainly similar to that of the leishmania form, consisting of a peripheral ring and a more or less central karyosome (Plate I, Figs. 2 and 3; Plate II, Figs. 8-12). The shape of the karyosome was variable, *viz.*, dot like elongated or elongated with irregular thickening in parts. The peripheral ring of the nucleus was slender and the karyosome was more conspicuous. Depending on the aspect of the flagellate visualised and on its type, the appearance of the nucleus varied to some extent. When mature flagellates were seen from the dorsal or the lateral aspect (Christopher *et al*, 1926), the nuclear pattern could be readily made out. But in thin elongated forms and when only oblique views were seen, the different components could not be so readily made out. It appeared as a dot-shaped or elongated karyosome with two dots on either side and in extremely slender forms, the nucleus appeared as an elongated structure. At times DNA at the periphery of the nucleus appeared in the form of small dots; in one specimen at least six dots could be counted. With methyl green stain the nucleus preserved more or less a similar appearance. With brilliant cresyl blue also the nucleus showed an outer blue ring and a central blue karyosome. (It appears that with Feulgen method there is considerable shrinkage of the flagellates in smears possibly on account of hydrolysis in N HCl at 60°C.) In dry smears subjected to the action of ribonuclease, the nucleus did not show any marked change. But in specimens subjected to the action of ribonuclease in the fresh state (*vide supra*), the nucleus showed a paler colour and in some of the flagellates the darker staining karyosome and the peripheral ring of the nucleus was replaced by a number of dark, short dot or rod like structures (Plate I, Figs. 4-8). The specimens in which the number of these structures could be counted, showed six such bodies against the pale background of rest of the nucleus, arranged along the margin of the nucleus or in two groups of three each at its either pole (Plate II Figs. 14-18). In a few specimens each of the six rod like structures was seen to be breaking up into pairs, the parabasal body was also found to be incompletely

PLATE I

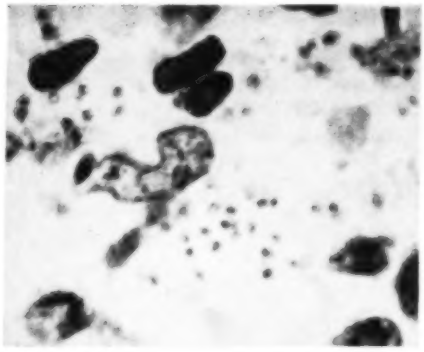


Fig. 1

Fig. 2

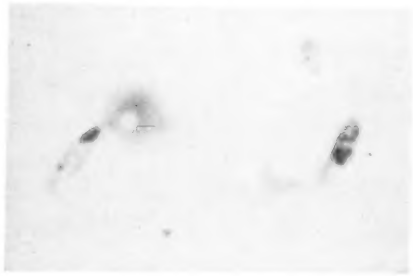
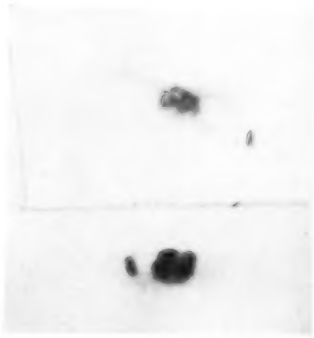


Fig. 3



Figs. 4 & 5

Fig. 6

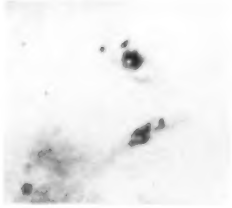


Fig. 7

Fig. 8

Fig. 1 — Photomicrograph of section of spleen stained with Feulgen method (without counterstaining) shows the ring like trophonucleus and the parabasal body closely connected with it.

Fig. 2 — Leptomonad of L. donovani stained by Leishman's stain showing structure of the nucleus.

Fig. 3 — Leptomonad stained with Feulgen method.

Figs. 4 - 8— Leptomonad of L. donovani acted on by ribonuclease in the fresh state, stained with Leishman's stain.

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PLATE II

Figs. 1 - 3 — Mitochondria of leptomonad of L. donovani stained with Janus green.

Figs. 4 & 5 — Neutral red vacuoles of the flagellate as seen under phase contrast microscope.

Figs. 6 & 7 — Appearance of the flagellate as stained with brilliant cresyl blue.

Figs. 8 - 12 — Flagellates stained by Feulgen method ; the nucleus, the karyosome and the parabasal body are Feulgen positive. Note the difference in the appearance of the nucleus.

Figs. 18 - 19— Fresh culture of L. donovani subjected to the action of ribonuclease and finally stained with Leishman's stain.

Figs. 20 - 28— Control specimen of above.

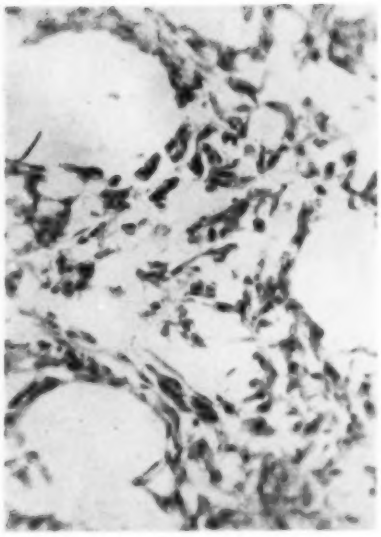

Fig. 1

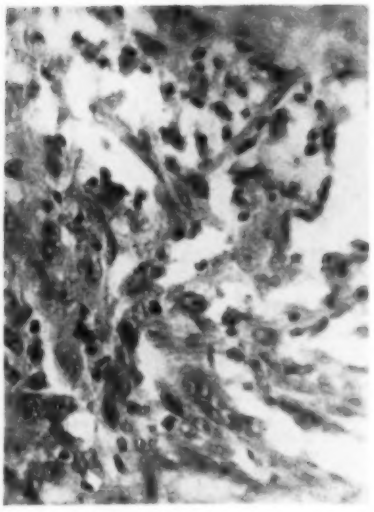

Fig. 2

divided into two parts. (Plate II, Fig. 13). In other specimens the darker staining peripheral ring and the dot like or elongated karyosome could be readily made out against the rest of the nucleus that was stained paler (Plate II, Fig. 19). In the control specimens though the nucleus at times showed similar rod like or dot like structures, the picture was never so clear as in the ribonuclease-treated smears (Plate II, Figs. 20-23).

The Kinetoplast

The kinetoplast consists of (a) the flagellar vacuole, (b) the parabasal body and (c) the base of the flagellum, the rhizoplast with under certain circumstances a terminally situated granule, (d) the blepharoplast (Christopher *et al, loc. cit.*). The parabasal body was found to be Feulgen-positive in both the leishmania and the leptomonad forms of *L. donovani*. It appeared as a thin rod or as a dot depending on the aspect of the parasite viewed. In tissue sections (Plate I, Fig. 1) it sometimes appeared closely connected with or overlapped by the ring like periphery of the nucleus—dorsal or ventral view of the L. D. body. The parabasal also stains with methyl green and with brilliant cresyl blue. It is not affected by the action of ribonuclease even in the fresh state.

The Cytoplasm and other Cytoplasmic Structures

The cytoplasm of the leptomonad form of *L. donovani* stained with pyronin showing a pink colour; but it was not affected by the action of ribonuclease in dry smears though in the same smear the cytoplasm of the plasma cells was completely washed out. In fresh specimens of leptomonads subjected to the action of ribonuclease, the cytoplasm definitely lost its basophilia and all cytoplasmic granules (volutin granules) seen in the control specimens. On staining with brilliant cresyl blue supravitally, the cytoplasm showed numerous granules but no definite reticular structure was seen to have taken the blue stain (Plate II, Figs. 6 and 7).

Stained with neutral red, the neutral red vacuoles, were found scattered in the cytoplasm of the leptomonad. These structures appeared as small vacuoles in which small granules of neutral red had been included when examined under the phase contrast microscope (Plate II, Figs. 4 and 5). The region of the nucleus, the parabasal and the flagellar vacuole did not show any neutral red granules.

With supravital staining with Janus green, a number of dots scattered irregularly in the cytoplasm were stained green (Plate II, Figs. 1-3).

So far it has not been possible to study satisfactorily the cytoplasm of the leishmania form of the parasite by using supravital staining with Janus green and neutral red, because of the minute size of the parasite. The cytoplasm of the L.D. body in dry smears appeared to be less basophilic when exposed to the action of ribonuclease than that of the control specimens; but this change was not convincing enough. It appears from our investigations that the method of enzyme digestion of dry smears as described by Snapper *et al* (*loc. cit.*) was not very suitable for the study of *Leishmania donovani*, though it was good enough for the plasma cells.

Discussion

The Feulgen reaction and staining with methyl green are specific reactions for desoxyribonucleic acid (DNA) and staining with pyronin and digestion with ribonuclease for ribose nucleic acid (RNA).

Our study of the nucleotides in *L. donovani* shows that DNA is present in the nucleus and the parabasal body of the parasite in both the leishmania and the leptomonad forms. The nuclear pattern is more or less identical in the two forms in so far as the distribution of DNA is concerned, viz., at the periphery of the vesicular nucleus (in the nuclear membrane) and in the karyosome. The nucleus of the L.D. body when stained with iron hæmatoxylin shows a peripheral ring of chromatin and a more or less central dot shaped and at times slightly elongated karyosome. With Leishman or Giemsa stain it is quite possible to distinguish the darker staining peripheral ring and the karyosome from the rest of the nucleus which appears paler, in well stained smears of spleen and bone marrow from cases of kala-azar. It is not difficult to show the ring like nuclear membrane and the parabasal body with the modified iron hæmatoxylin stain we have been using for several years in sections of spleen from kala-azar cases or of the skin from cases of nodular type of post-kala-azar dermal leishmaniasis. It is however difficult to demonstrate the karyosome in tissue sections. In both smears and tissue sections stained by the Feulgen method, the appearance of the nucleus and the parabasal body have corresponded to that seen in our iron hæmatoxylin stained specimens.

It is generally agreed that the nucleus of the leptomonad form of *L. donovani* is vesicular, that the karyosome stains readily with iron hæmatoxylin and that there is clear space between the karyosome and the nuclear membrane. According to Knowles (1928) the nuclear membrane of the flagellate does not contain any chromatin. Though most of the illustrations of the leptomonads stained by Shortt do not show any peripheral chromatin, apparently he had found peripheral chromatin in the nucleus of the flagellate form of *L. donovani* in some of his specimens (Fig. 44, Christopher *et al, loc. cit*). We have also found that there is a peripheral ring of chromatin in the nucleus of the leptomonad stained with modified iron hæmatoxylin stain. As already described above, with the Feulgen stain the peripheral ring of DNA which is associated with chromatin is readily seen. The wide variation in the shape of the karyosome noted by Christopher *et al* (1928) as well as by us in our iron hæmatoxylin and Feulgen stained specimens is probably antecedent to or associated in some way to rapid multiplication of the leptomonads (Christopher *et al, loc cit.*).

The disparity in the appearance of iron hæmatoxylin and Feulgen stained specimens with regard to the presence of peripheral chromatin is difficult to explain; possibly it is due to the difficulty in controlling differentiation with the older iron hæmatoxylin staining techniques. The Feulgen method is a specific reaction for DNA and thus the appearance of the nucleus of the leptomonad as seen with this method represents the true picture and there is DNA in the nuclear membrane of the leptomonad as in the leishmania form.

The parabasal body is Feulgen positive and stains with methyl green. Hence it contains DNA that is associated with chromatinic structures.

The fact that the parabasal body lying on the dorsal wall of the flagellar vacuole and usually occupying a posterior position, contains DNA may be held as evidence in support of the view that these two together represent the second nuclear structure in the protozoon, the flagellar vacuole being the nuclear sac and the parabasal body the chromatinic structure (*c.f.* Christopher *et al, loc. cit.*). This nuclear structure is concerned with the movements of the flagellate and as such the term kinetonucleus may not be very inappropriate for it, the term trophonucleus being reserved for the nucleus.

With supravital staining with Janus green and neutral red the mitochondria and the neutral red vacuoles were demonstrated in the leptomonad form of the parasite. Granules seen in the leptomonads in dry smears stained with Leishman or Giemsa stain (volutin granules) apparently contain RNA being digested by ribonuclease. The cytoplasm of the leptomonads contain RNA because it stains with pyronin and its basophilia is markedly discharged as a result of enzyme (ribonuclease) action. In iron hæmatoxylin stained specimens the cytoplasm often appears reticular but no such reticular structure could be demonstrated by supravital staining with brilliant cresyl blue.

Finally, as regards the changes noted in the nucleus of the leptomonads as a result of enzyme action in the fresh state dots or rods seen are probably the chromosomes of the leptomonads possibly liberated from its RNA-containing binding substance as a result of ribonuclease action. The number of these structures appears to be six. Thus *L. donovani* may be regarded as an organism the nucleus of which breaks up into six chromosomes and when division occurs these chromosomes divide into two sets of six each.

Summary

Cytological study of *L. donovani* in its leishmania and leptomonad form has shown that the nucleus and the parabasal body contain desoxyribonucleic acid (DNA). The distribution of DNA in the nucleus is described; only the karyosome and the periphery of the nucleus of both the leishmania and the leptomonad forms show the presence of DNA. Ribose nucleic acid (RNA) is present in the cytoplasm of the leptomonad form. The presence of mitchondria and neutral red vacuoles have been demonstrated in the leptomonads. Cytoplasmic granules (volutin granules) of the leptomonads are dissolved by ribonuclease and thus consist of RNA. Subjected to the action of ribonuclease, in the fresh state, the nucleus of the leptomonads shows dissociation into six dots or small rod like bodies that are probably the chromosomes of the flagellate.

Acknowledgment

We greatly appreciate the courtesy of Dr. M. Kunitz, formerly of the Rockefeller Institute of Medical Research, and Dr. I. Snapper, Director of Medical Education, The Mount Sinai Hospital, New York, who kindly made crystalline ribonuclease (Kunitz) available to us for our investigations.

We are also thankful to Dr. N. N. Das Gupta of the Nuclear Physics Institute, Calcutta, for preparing some of the photomicrographs included in this paper.

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THE ISOLATION OF ENTERIC GROUP OF ORGANISMS FROM CONTAMINATED BLOOD SAMPLES

A Comparative Study of D.E.C. and B.S.A. Media

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Typhoid fever is endemic in the City of Bombay. At present as many as 4,000 febrile cases are annually referred to this Institute. A fair number of blood samples received showed contamination and it became a problem to isolate typhoid organisms from such material. In the majority of contaminated samples usually, one contaminant was found to be present at a time.

In the cultural examination of blood, such contaminants could not be suppressed by the use of liquid enrichment media. This difficulty, it may be stressed, was distinct from the examination of fæces, where due to a certain amount of bacterial antagonism the isolation of the pathogens was comparatively an easier matter.

Despite the development of a number of selective and differential media for the isolation of the enteric group of organisms, from grossly contaminated material, no single medium may be said to be entirely satisfactory. Recent studies have shown that, MacConkey, desoxycholate citrate (Leifson, 1935) and the Difco Modified Bacto S.S. agar are all improvements upon one another (Hynes, 1942; Pot, 1942; Tomlison and Linsell, 1946; Smith, 1952). Panja and Ghosh (1943), failing to obtain sodium desoxycholate and, some of the Bacto labelled constituents for the S.S. agar devised the D.E.C. medium (dysentery, enteric, cholera medium) —a medium equally suitable for the growth of dysentery, enteric and cholera organisms. Soman (1944) tried this medium in 37 fæcal samples obtained from enteric convalescent cases and found it to compare favourably with the bismuth sulphite agar of Wilson and Blair. Since then the D.E.C. medium has been routinely used in this laboratory as a differential plating medium. This medium, however, presents one difficulty in that the saprophytic non-lactose fermenters, with their similarity of naked eye appearance to the enteric group of organisms caused difficulty in selection of colonies for biochemical and serological investigations. To obviate this difficulty it seemed desirable to use the bismuth sulphite agar in addition to the D.E.C. An opportunity was thus taken to make comparative study of the two media, namely, the D.E.C. and the B.S.A. This examination deals with the results obtained from 628 contaminated blood samples.

Materials and Methods

The material for investigation consisted of blood samples from suspected enteric cases, the majority of which were received from the City Fever Hospital and a fair proportion from private practitioners in the city of Bombay.

In an investigation of this nature the selection of a suitable medium is of the utmost importance. It was necessary to study a few of the commonly suggested Wilson and Blair media and to see how they worked in our hands. From time to time various modifications of the B.S.A.'s medium have been suggested. Hobbs and Allison (1945) were of the opinion that the modification suggested by de Loureiro (1942) and a powder K which is a mixture of the selective chemicals used in Wilson and Blair medium in a dry form, gave slightly superior results than the others. The B.B.S. medium (bismuth, brilliant green, sulphite, agar) (Saga Tyagaraja, 1940) being the simplest modification of the B.S.A. medium was also compared. The following media were selected for the preliminary experiments.

(1) Bismuth-sulphite agar—Wilson and Blair, (1938), with slight modifications—Mackie and MacCartney (1950).

(2) Wilson and Blair A. B. C. medium—de Loureino (1938).

(3) Wilson and Blair B.B.S. agar—Saga Tyagaraja (1940).

(4) The powder K—Hobbs and Allison (1945).

A few pilot experiments were carried out with blood clots in bile broth samples, which were known positives and known negatives for typhoid group of organisms. Eighty samples were put up on different media. These samples contained 10 each of pure growth of *B. typhosus* and *B. para A* on nutrient agar, and

Table 1—Results of Pilot Experiments Showing the Growth of B. Typhosus on Different Media

Inoculum	*Total*	*DEC*	*BSA*	*K*	*ABC**	*BBS*
B. typhosus	10	10	10	10	10	8
Gram +ve cocci & B typhosus ...	10	10	9	10	9	3
Spore bearers & B. typhosus	10	9	10	10	10	2
B. pyocyaneus & B. typhosus	10	6	10	9	9	2
Coliform Organisms & B. typhosus ...	10	8	10	8	7	2
Total	50	43	49	47	45	17
B. para A	10	10	3+(7)	6+(2)	3+(6)	6
Gram +ve cocci & B. para A	5	5	3+(2)	3	5	1
Spore bearers & B. para A	5	5	4	4	5	2
B. pyocyaneus & B. para A	5	1	2	—	—	—
Coliform organisms & B. para A	5	5	4+(1)	5		3
Total	30	26	16+(10)	18+(2)	18+(6)	12

* de Loureiro's modification ( ) Sterile at 48 hours but on further incubation typical colonies developed.

40 samples of *B. typhosus* along with various contaminants, and 20 samples of *B. para A*. Using a standard loop, one loopful of the material was plated in a similar manner on the different media plates. The plates were incubated for 48 hours at 37°C., and examined for typhoid group of organisms and contaminants. The results are set out in Table 1.

These experiments made it evident that the medium of choice was the modification of B.S.A. suggested by (Mackie and McCartney *loc. cit.*). The technique of preparation of the medium was followed very closely to that described by the authors except that 4 per cent agar was used instead of 3 per cent agar as the 3 per cent agar base medium was found to be too soft in our hands.

From the samples of blood, serum was first separated. The blood clots were transferred to a medium containing ox bile peptone and glycerine. From these, after 24 hours, incubation at 37°C. subcultures were made on nutrient agar. Those samples showing pure growth were taken up for further biochemical and agglutination tests, for identification of the organisms. Those that did not show any growth were plated repeatedly on nutrient agar, till they were declared negative on the sixth day. The samples showing suspicious colonies and contaminants on nutrient agar were plated on the D.E.C. and the B.S.A. In the initial stages of this study both the media were inoculated simultaneously. This was not considered necessary because in the event of D.E.C. plate being sterile, the B.S.A. was not likely to show any growth. It was also found that whenever D.E.C. plates showed pure growth of enteric organisms, the B.S.A. also invariably gave positive results although the growth appeared 24 hours later. In the event of D.E.C. plates showing gross contaminants and not enteric group colonies, B.S.A. was inoculated to ensure picking up colonies lost on D.E.C. plate if enteric group organisms were present in the original material. Hence in the latter part of the study the D.E.C. medium was employed first and the B.S.A. was employed only in cases where the D.E.C. was grossly contaminated, to save both material and labour. By waiting for 24 hours more, half the number of the B.S.A. plates could thus be saved.

Isolation of Enteric Organisms from Contaminated Blood Clot Samples

The results of cultural examination of a representative group of 628 samples which were grossly contaminated and in which, with the D.E.C. medium, no enteric organisms could be detected, are set out in Table 2. The first column gives the predominant types of contaminants as on nutrient agar. Column 2 shows the number of plates of the D.E.C. medium in which there was growth of the contaminants but no enteric type colonies could be seen. Column 3 shows the number plates of B.S.A. medium which were sterile. Column 4 shows the number of plates in which there was growth but there were no enteric type of colonies and column 5 shows the number of B.S.A. plates which showed enteric type colonies and which were later confirmed by biochemical and agglutination tests.

Table 2—Showing Growth of Contaminants and Enteric Organisms on D.E.C. and B.S.A. Media

Nature of Predominant Contaminants	D.E.C. Contaminants Enteric – ve	B.S.A.		
		No growth	Contaminants Enteric – ve	Enteric + ve
1	2	3	4	5
Sporebearers	170	168	1	1
Gram + ve cocci	216	208	7	1
B. pyocyaneus	151	57	66	28
Coliform organisms	91	73	10	8
Total	628	506	84	38

It would be seen that out of 628 samples declared negative for enteric group by the use of the D.E.C. medium alone, 38 *samples were positive for enteric group on B.S.A. Medium* (36 *B. typhosus* and 2 *B. para A*). This means that 6 per cent of the cases which would have been otherwise missed, were identified with the help of the B.S.A. medium. Of more significance are the 28 out of 151 positive results on B.S.A. from samples contaminated by B. pyocyaneus giving an additional 18 per cent result in favour of B.S.A. medium. The typhoid group of organisms grew with distinct colony characteristics and earlier as compared with the contaminants. Of the remaining 590 cases the B.S.A. medium was sterile in 506 cases thereby showing that this medium was more inhibitory to contaminants than the D.E.C. In 84 cases contaminants were present on both the media but the number of colonies was less on the B.S.A. A point worth stressing is that *B. pyocyaneus* gave non-spreading greenish white colonies which grew later than the typhoid colonies, whereas on the D.E.C. medium *B. pyocyaneus* was a spreader and enteric group colonies could not be distinguished after 18-24 hours.

Discussion

Both the D.E.C. and B.S.A. media have their advantages and disadvantages. The D.E.C. medium has the following advantages. Firstly, the growth of *B. typhosus* is earlier than on the B.S.A.; secondly, the medium being mildly inhibitory there is a luxuriant growth of the typhoid organisms and hence sufficient material is available for direct slide agglutination after performing the routine tests. But this property of mild inhibition is also a great disadvantage as many non-lactose fermenters, even sporebearers grow profusely on the medium and hence lead to confusion. *B. pyocyaneus* grows as a spreader and once it has taken hold of the plate nothing can be distinguished

even within 18 hours. A lesser disadvantage of the medium is that the colony character of *B. para A* and *B. typhosus* are not distinguishable.

The most important advantage of the B.S.A. medium is the unmistakable colony appearance of both *B. typhosus* and *B. para A*. On this medium *B. typhosus* gives flat black colonies with a metallic lustre and a halo of the black dye—the colonies when fished with a platinum loop leave a black stain behind. *B. para A* gives characteristic green colonies which do not have a halo nor do they leave a stain behind. Another important advantage of this medium is that contaminants even *B. pyocyaneus* grows as discrete colonies and not as spreaders. *B. pyocyaneus* gives white, pin-point colonies later turning greenish brown, quite distinct from *B. para A*. It is of interest to note here that in Table 2, amongst the 38 additional positive that could be recognised by the B.S.A. and which had failed to be recognised by the D.E.C. medium 28 were in association with *B. pyocyaneus* as the predominant contaminant and 8 with coliform organisms. Of course, the medium suffers from some disadvantages, the chief being, the time it takes for *B. typhosus* to grow. *B. typhosus* has been known to grow as late as the third day after inoculation and hence the plates have to be kept at least for four days before being declared negative for typhoid group of organisms.

Conclusions

This work does not suggest the replacement of one medium for the other, but merely emphasises that in all grossly contaminated cultures, the B.S.A. medium should be used as a subsidiary medium to the D.E.C. as far as the isolation of typhoid group of organisms is concerned. A higher percentage of positive results can be obtained by using both media. The B.S.A. medium inhibits practically all the common intestinal non-pathogens growing only a few species of coliform and Salmonella group. The D.E.C. offsets in a measure, the limitation of the above by growing all gram negative organisms. Thus, the concomitant use of both the media one complementing the other, each in part overcoming the limitations of the other is regarded as a distinct advance in the routine technique for isolation of typhoid group of organisms from contaminated material.

Acknowledgment

We wish to thank the Director, Haffkine Institute for permission to publish this paper and Col. J. R. Dogra, Asst. Director, for the facilities afforded and the keen and helpful interest taken in this investigation.

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TUBERCULIN SENSITIVITY OF TUBERCULOUS PATIENTS

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Tuberculosis is a disease of world wide distribution, its causative organism respecting neither geographical nor racial barriers. However the disease is not believed to conform to the same pattern all over the world. Differences in the course or manifestations of the disease have been reported to exist among different peoples living in different parts of the globe. Such differences are difficult to evaluate, though, as they are usually derived from comparisons of data compiled by different workers each using his own methods and his own criteria.

One feature of tuberculous disease particularly suited for comparative study—lending itself readily to quantitative measurement—is the sensitivity to tuberculin. In a study conducted jointly by the U. S. Public Health Service and the Tuberculosis Research Office of the World Health Organization the degree of tuberculin sensitivity associated with clinical tuberculosis has been investigated in more than 3000 patients under treatment in six tuberculosis hospitals; one each in Denmark (øresund), Egypt (Mehalla) and India (Kanchrapara), and three in the United States (Glen Lake Sanatorium, Charity Hospital and Battey State Hospital, the latter two housing both white and Negro patients) (Palmer and Bates, 1952).

Intradermal 1 TU tuberculin tests* were given to all patients. Those reacting with less than 10 mm. of induration as a rule received a further test with 10 TU. To ensure comparable results, all tuberculin testing was carried out by field research teams from the WHO and the USPHS specially trained in the use of uniform, standardized testing procedures. At each hospital all reactions were read by one member of the team who carefully measured the diameter of induration with a millimeter ruler. Two PPD tuberculins were used: PPD-S in the U.S.A. and Danish RT IX-XX-XXI in

* 1 tuberculin unit = 0·00002 mgm. reference standard P.P.D. (purified protein derivative) = 0·01 mgm. International standard old tuberculin.

the other countries. Careful field comparisons had previously shown these two products to be of equal potency in the close-range 1-10 TU. (Nissen Meyer, 1952).

The test-results were analyzed separately for the patients in each hospital. The various groups of patients showed striking uniformity in their response to a low dose of tuberculin; the average size of the reactions in 1 TU ranged from 12·4 mm. in the white patients at Charity to 14·6 mm. at Mehalla (and for Negroes at Battey)—a difference of only 2·2 mm. Moreover, when grouped according to size, the 1 TU reactions at each hospital show a similar fairly symmetrical distribution with all but a few reactions falling within the range 5 to 25 mm. and those of 12 to 14 mm. being the most frequent (Fig. 1).

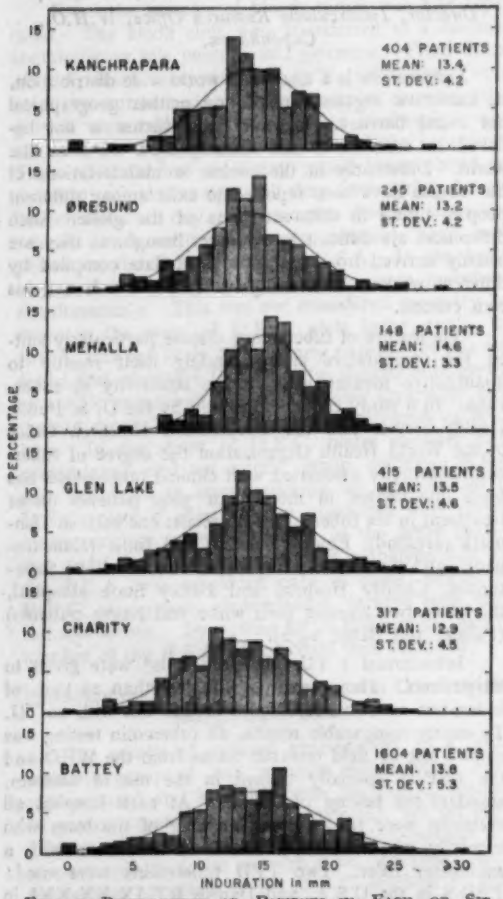

FIG. 1—DISTRIBUTION OF PATIENTS IN EACH OF SIX TUBERCULOSIS HOSPITALS ACCORDING TO THE TRANSVERSE DIAMETER OF INDURATION OF THE TUBERCULIN REACTIONS TO THE MANTOUX 1 TU TEST (SHOWING SUPERIMPOSED NORMAL PROBABILITY CURVES)

Breakdowns according to sex and age provided little evidence that sex and none that age has any significant influence on the tuberculin sensitivity. Information on racial differences was derived from a comparison of the 1 TU reactions of white and Negro patients at two hospitals in the U.S.A.; at both, the Negroes showed only a slightly higher level of tuberculin sensitivity.

In an attempt to determine how satisfactory the 5 TU test would be as a single-dose procedure for screening tuberculous patients in a general population, the 1600 patients at one hospital in the U. S. A. were given a 5 TU test simultaneously with the 1 TU test, one test in each arm. The larger dose was found to elicit larger reactions; the 5 TU reactions average 18·3 mm. or nearly 5 mm. more than the 1 TU reactions. Only 1·1 per cent of the patients had 5 TU reactions measuring less than 5 mm. (as compared with 3·8 per cent for the 1 TU reactions), and a review of the clinical records showed that half of these patients were either misdiagnosed or in the terminal stage of tuberculosis (when sensitivity to tuberculin often wanes). This means that in a mass tuberculin-testing program in which the criterion for a positive reaction is set at 5 mm. or more of induration a single test with 5 TU would fail to elicit a positive reaction only in about 1 out of every 200 cases of clinical non-terminal tuberculosis and would thus be highly efficient as a preliminary case-finding procedure.

The findings from this series of tuberculin surveys of hospitalized tuberculous populations in four continents suggest that clinical tuberculosis probably is universally associated with sensitivity to a low dose of tuberculin. Despite differences in environment, race, color, nutritional status and other factors believed to influence the pattern of tuberculous disease, the groups of patients tested all presented approximately the same degree of sensitivity to tuberculin.

As emphasized by the present study, comparison of results derived from uniformly executed tuberculin testing of different population groups may yield much valuable information. In general, however, tuberculin surveys carried out in different countries or even in different regions within the same country fail to provide comparable results because of wide variations in testing technique, and particularly in the type of tuberculin employed.

Undoubtedly it would be of great advantage if a large supply of a single batch of international tuberculin could be prepared and made generally available at a low subsidized price.

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PREPARATION OF NEAR TO STERILE CALF LYMPH (VACCINE LYMPH) BY THE "STREPTOMYCIN TECHNIQUE"

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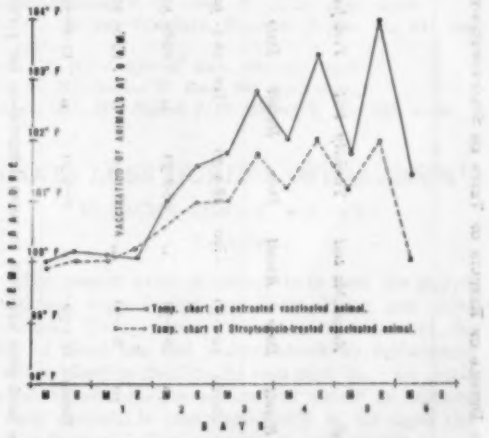
No completely satisfactory method is known for the bacterial purification of calf lymph. The existing techniques (chloroform, clove oil, etc.) are essentially in the nature of a compromise,—either they affect the potency of the lymph or they do not reduce the bacterial contamination effectively. I describe here what may be termed as the 'Streptomycin Technique', evolved and adopted by me at the Govt. Vaccine Institute, Bangalore, which offers marked advantages over the other existing techniques. The advantages are a high degree of purity, high potency and reduced costs.

The technique is based on the findings of a detailed study of the effects of penicillin and streptomycin on calf lymph made by me at the Govt. Vaccine Institute, Bangalore. Penicillin is found to be ineffective (Krishnamurthy, 1949; Sanjiva Rao, 1949; Krishnamurthy, 1950a and Krishnamurthy, 1950b) contrary to the views held by certain workers (Diaz Romero, 1945; Morin and Turcotte, 1946; Patel, 1948; Roy, 1949) in reducing the bacterial contaminants of vaccine lymph. Streptomycin (Krishnamurthy, 1950a and 1950b, *loc. cit.*) either singly or in combination with penicillin is quite effective in reducing the bacterial flora of the vaccine lymph to a substantial extent, even when applied locally over the vaccinated area of a calf. While the Therapeutic Substances Regulations of Great Britain and the Indian Drugs Rules permit the presence of organisms up to 20,000 per ml. of vaccine lymph, the bacterial counts of most of the streptomycin-treated lymphs have been about 200 or less and some samples show no bacteria at all. Further, the streptomycin-treatment, does not affect the potency of the vaccine lymph. This permits the use of highly diluted vaccines, thus contributing towards a substantial savings in production costs. Based on these findings we are adopting one or both of the two following procedures for the preparation of vaccine lymph at the Government Vaccine Institute, Bangalore.

A day prior to vaccination the abdomen and the inner side of the thighs of a healthy female buffalo calf is shaved and washed with soap and sterile water for one hour. Finally, the shaved area is cleaned with sterile distilled water, dried and covered with a sterile bandage and tied in the 'vaccinated-calf shed' Suitable bedding is provided to the calf and changed as often as is found necessary.

Vaccination of the animal is done the next morning in the 'vaccination-room'. Immediately prior to vaccination, the shaved area of the abdomen of the calf is cleaned with soap and sterile water for an hour, rinsed well in sterile distilled water and dried. Acetone is then applied liberally over the washed area. The operator conducts vaccination of the animal in the usual aseptic manner using "Seed Lymph" of satisfactory potency and bacterial purity*. Six hours after vaccination, streptomycin preferably dihydrostreptomycin sulphate or hydrochloride, in concentration of 10 to 20 mgm. per ml. in 50 per cent sterile glycerine of pH 7·6, is applied externally over the vaccinated area and its neighbourhood (in fact, all over the shaved area of the abdomen). This is repeated twice daily from the following day till the evening of the 5th day after which no more streptomycin is applied. The development of vaccine vesicles in the streptomycin-treated calf is normal and differs in no way from the untreated animal. Throughout this period the animal remains lively and feeds well. Fever, though present in the animal is not marked (*vide* Temperature Chart).


VACCINATION OF ANIMALS AT 9 A.M.
Temp. chart of untreated vaccinated animal.
Temp. chart of Streptomycin-treated vaccinated animal.
DAYS

TEMPERATURE CHART OF UNTREATED AND STREPTOMYCIN-TREATED VACCINATED ANIMAL

When the vesicles are ready for collection they are scraped in the usual way, weighed and mixed with 50 per cent sterile glycerine of pH 7·6 in proportion of 1: 5. Till required for tests, the same is kept in the cold storage at a temperature of −10°C. or less.

TESTS

All the samples are subjected to tests indicated in Table 1. It is seen that the bacterial reduction is satisfactory in most samples; rarely a few might show one or two colonies of hæmolytic staphylococcus or

* Bacterial reduction of the 'Seed Lymph' is effected in this Institute by bubbling chloroform vapour through the lymph for about an hour when most of the vegetative organisms are destroyed. The residual chloroform in the lymph is removed by passing filtered air through it for about 3 hours. Other methods may also be employed for the purpose but at no time should the seed lymph be treated with streptomycin as the development of streptomycin-resistant strains in the seed lymph would be most undesirable.

TABLE I—SHOWING DETAILS OF RESULTS OF TESTS ON STREPTOMYCIN-TREATED LYMPH

Sl. No.	Brew No.	Date of Manufacture	Concentration of Streptomycin per ml. in 50% glycerine employed	Colony count per ml. Initial Date	Initial Result	Final Date	Final Result	Anaerobic test Date	Anaerobic test Result	Toxicity test Date	Toxicity test Result	Test for B. Coli Date	Test for B. Coli Result	Test on blood-agar for pathogenic organisms Date	Test on blood-agar for pathogenic organisms Result	Potency test on rabbits Date	Potency test on rabbits Result	Highest dilution giving 100% success rate on children*
1.	77B	20-12-49	20 mgm.	3-1-50	100	12-7-50	Sterile	12-1-50	—ive	18-1-50	—ive	28-2-50	—ive	20-3-50	—ive	3-2-50	10^{-8}+	1 in 30
2.	96B	18-1-50	10 mgm.	24-1-50	60	30-3-50	40	8-2-50	,,	28-2-50	,,	19-6-50	,,	20-3-50	,,	13-3-50	10^{-10}+	1 in 20
3.	97B	18-1-50	10 mgm.	24-1-50	50	30-3-50	70	8-2-50	,,	28-2-50	,,	19-6-50	,,	20-3-50	,,	13-3-50	10^{-10}+	1 in 30
4.	57B	22-7-50	10 mgm.	11-8-50	Sterile	16-1-51	Sterile	17-2-50	,,	26-9-50	,,	17-10-50	,,	11-8-50	,,	16-10-50	10^{-1}+	1 in 20

* Vaccine used after exposure to room temperature for 3 days.

other pathogens rendering the lymph unsuitable for immediate use. In such cases the lymph is kept back in the cold storage for a few weeks when these organisms disappear.

FIG. 1—EIGHTH DAY VESICLE OF CHLOROFORM TREATED CALF LYMPH. NOTE THE SEVERITY OF THE LOCAL REACTION AROUND THE VESICLE. TEMPERATURE OF THE CHILD WAS 101°F. AND THE CHILD WAS RESTLESS AT THE TIME OF INSPECTION

FIG. 2—EIGHTH DAY VESICLE OF STREPTOMYCIN TREATED LYMPH. NOTE THE MILD CHARACTER OF THE REACTION AROUND THE VESICLE. TEMPERATURE OF THE CHILD WAS 99°F. AND THE CHILD WAS ACTIVE AND CHEERFUL AT THE TIME OF INSPECTION

The other method consists in adding dihydrostreptomycin-sulphate in concentration of about 10—20 mgm. per ml. to the glycerine lymph prepared in the usual manner. The various tests are conducted after about a week. It is seen that almost all the vegetative organisms are destroyed under this treatment also and the lymph will be ready for use almost immediately.

When all the tests are found to be satisfactory, the potent lymph is available for immediate use. The streptomycin-treated vaccine lymph is potent even in 10^{-8} or more dilution. It is this important fact that permits the use of highly diluted vaccines. It is our experience that a 10^{-6} potency would suffice for successful takes on children under our local tropical conditions. The maximum extent a particular brew of vaccine could be diluted is worked out in the following manner. The lymph in question is diluted 10, 20, 30 and 50 times and the potency of the diluted lymphs is tried in the usual way on the rabbit by the linear scratch method. Only such of those diluted lymphs potent in 10^{-8} or more dilution are kept at room temperature for 3 days and tried on children clinically. The dilution with a 10^{-8}+ potency giving hundred per cent success rate on children will be issued for vaccination to ensure high percentage of success in the field (Table 1). The field reports have also been satisfactory with an uniformly good success rate, averaging to 90 per cent. The 'takes' compare favourably with the chloroform-treated lymph and if at all, the local reactions are milder with little or no induration (Figs. 1 and 2), severe systemic symptoms like high fever are also very rare.

It has been found that the streptomycin-treated lymph can be diluted about 20 times for field use. Apart from greater purity this is a decided advantage over other methods of purification.

The recent smallpox epidemic season has well served to prove the protective value of the streptomycin-treated calf lymph against smallpox. Reports from the epidemic areas show that smallpox was controlled after mass vaccination with this vaccine, as effectively as with the usual calf lymph. One striking personal experience is worth mentioning here. A few cases of small-pox were reported in a labour colony near Bangalore. Investigation showed that there were a large number of unprotected children. Vaccination and re-vaccination with this vaccine were immediately instituted and the results were closely observed. No further cases of smallpox were seen in this area after vaccination of the population of the colony with this vaccine.

SUMMARY

A new technique of purification of vaccine lymph with streptomycin, developed by the author at the Government Vaccine Institute, Bangalore, is described. The advantage of the new method is that one can prepare a purer and a substantially cheaper vaccine than before. Further, the vaccine lymph could be made available for use, almost immediately after manufacture.

ACKNOWLEDGMENTS

I am thankful to the staff of the Institute for their co-operation in this investigation. My grateful acknowledgments are due to Dr. R. Ramachandra Rao, Dr. B. Ananthaswamy Rao of the Mysore State Department of Public Health and Dr. C. V. Natarajan, Deputy Director of Public Health for their critical encouragement during the field trial and to Dr. R. K. Anderson (of the Rockefeller Foundation) for the photographs. Last but not least I am greatly indebted to Dr. T. Chandrasekharaiya, Director of Public Health in Mysore, Bangalore, for his guidance, support and advice which have been freely placed at my disposal right from the conception of the idea to the successful field application at every stage of the work and for permission to publish this paper.

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BLOOD LOSS DURING OPERATIONS*

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The present trend of surgery is to keep the patient in normal physiological condition during and after operation. Every attempt is made to counteract the effect of blood loss and prevent shock by replacement of either blood or fluid as the case may be. To obtain the full benefit, the correct amount should be replaced in most favourable time particularly in the aged and poor risk cases. The amount of replacement should be optimal as both excess and insufficient replacement are harmful and ineffective.

Subjective estimation of the total amount of blood lost during an operation is a very poor guide more so in the old and in poor risk cases. This estimation is liable to a wide personal variation. Various methods have been advocated for the estimation of the need and the quantity of blood to be replaced during and after operation. Some of the older indirect methods were based on determination of hæmatocrit reading, measurement of hæmoglobin and plasma proteins (Moon, 1942; Lyon, *et al*, 1949), but these methods were unsatisfactory, because there was little correlation between these factors and the blood lost (Bonica *et al*, 1951).

It may be true that determination of the red cell mass is a more accurate technic, because it measures

* This work was supported by a grant from Indian Council of Medical Research.

not only the blood collected by sponges and drapes but also that lost into the tissues at the site of the operation and that immobilised proximal to ligatures which is lost to the circulating blood volume. For practical purposes a direct method had been proposed by Gatch and Little (1924) for estimation of the actual loss of blood during surgical procedure. The principle followed was formation of acid hæmatin from the washing of the sponges, linens and instruments, etc. This method was modified by various workers (Coller and Madock, 1932); Pilcher and Sheard, 1937; Hubly, 1937, White *et al*, 1938 and others).

This method has advantages as well as disadvantages. A simpler gravimetric method advocated by Wangensteen (1942) was employed by Lyon *et al* (1949) and Lenahan *et al* (1948). Bonica and Lyter (1951) modified the original method of Wangensteen to obviate its few disadvantages. The gravimetric method with all its advantages seems less useful in our experiment as the atmospheric temperature is fairly high in the tropics throughout the year. The drying of the sponges can hardly be prevented even on the operating table. In the present investigations the colorimetric method of Gratch and Little with slight modification has been used and found to yield satisfactory results. The temperature does not interfere in the least in this method and the sterile water or saline can be used to moisten the sponges without in any way interfering with the accuracy of the method. The only disadvantage is that estimation is not as quick as in the other one.

Method

The procedure followed was according to Gratch and Little (*loc. cit.*) with some modifications. All the used water or saline and the sponges were collected in a bucket. Immediately after the operation the towels, mops, sponges and instruments were collected. All used water as well as the washing were collected and measured in mls. The total hæmoglobin lost was measured by the method of Peter and Von Slyke (1932) and Sheard and Sanford (1933). 5 ml. of the sanguinous fluid was added to an accurately measured 6 ml. of 0·1 per cent of sodium carbonate solution. The amount of hæmoglobin solution was thus 250 times more than in the original method—5 ml. instead of 0·025 cmm. in 5 ml. sodium carbonate solution. The concentration of the hæmoglobin solution was increased to facilitate the reading of the photoelectric colorimeter. The hæmoglobin concentration of the solution was determined with a Lietz photoelectric colorimeter using a filter of 550 mμ. Similarly, the blood hæmoglobin of the patient was determined just before the operation. The total blood lost was calculated from blood hæmoglobin gm/100 ml. (BH), the fluid hæmoglobin gm. per 100 ml. (FH) and the total volume of the washing (ml) (W).

$$\text{Blood lost} = \frac{FH \times W}{BH \times 250} \times 250$$

250—The concentration of the hæmoglobin solution used.

The amount of blood lost during different operations in 26 subjects was estimated and the results are shown in Tables 1 and 2. These operations were performed by one surgeon and his team. Estimation of the total blood volume, hæmoglobin and red blood cells were made before and after the operation in each.

Table 1

Subject No.	*Operation*	*Blood lost in c.c.*	*Per cent of total blood volume*
185	Herniorrhaphy	7·8	0·15
188	Herniorrhaphy	27·2	0·51
193	Herniorrhaphy	115·0	2·1
	Herniorrhaphy	27·7	
	Herniorrhaphy	10·0	
201	Hydrocele	8·1	0·15
	Hydrocele	24·7	
194	Appendicectomy	22·8	0·62
199	Appendicectomy	17·9	0·38
203	Appendicectomy	54·5	1·7
202	Appendicectomy	33·4	
183	Cholecystectomy & appendicectomy	349·4	7·36
186	Ditto	146·5	3·6
190	Ditto	58·5	1·4
192	Ditto	57·5	1·8
195	Ditto	300·6	8·7
200	Ditto	191·1	5·0
197	Drainage of the bile duct	432·2	11·3
182	Mastectomy	357·0	8·1
184	Mastectomy	935·9	27·6
191	Mastectomy	338·1	8·59
204	Hemicolectomy	154·4	4·2
196	Gastrojejunostomy	34·5	0·88
198	Excision of jaw	751·0	15·6
189	Pyelolithotomy	279·3	6·1
	Amputation of penis	414·7	8·08

Table 2

Operation	BLOOD LOSS IN PRESENT SERIES *No.*	*Maximum*	*Minimum*	*Average*	LITERATURE *Average blood loss in c.c.*	*No. of cases*
Radical mastectomy	3	935·9	338·1	560·0	689·0	68
Cholecystectomy	6	349·4	57·7	183·8	188·5	54
Bile duct	1			432·0	395·0	26
Appendicectomy	4	54·5	17·9	32·2	84·0 10·0	25 110
Herniorrhaphy	5	115·0	10·0	37·5	35·0 58·0	48 41

Results

The results of 26 observations are given in Table 1.

There is no correlation between the red cell count, blood volume, etc., and the amount of blood lost except where the loss is marked. Cases where the blood loss

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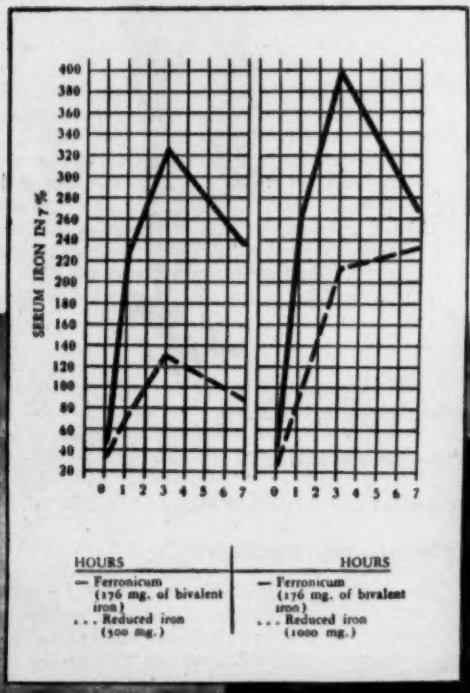

The graph shows the better absorption of Ferronicum as compared to reduced iron. Small oral doses of Ferronicum increase the serum iron level far more than large doses of reduced iron (average from 5 patients). (Jasinsky, Schw. Med. Wschr., 80, 59, 1950)

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is more than 10 per cent of the total blood volume, showed a decrease in hæmoglobin, red cell count and total blood volume; the degree of the fall in hæmoglobin, red cell count, etc., and amount of blood loss does not show any relation to the amount of blood loss. The average blood loss in some of the common surgical operations is seen in Table 2. It was similar to that reported by various workers in different countries.

Discussion

It is generally accepted that replacement therapy is the prophylactic and therapeutic measure against shock and operative morbidity. The present investigation was undertaken to estimate the correct amount of blood loss in different surgical operations so that proper replacement of fluids can be resorted to. Though the present series is rather small for any definite conclusions to be drawn the results are interesting because investigations of these types might provide some indication of the amount of blood loss during a particular operation.

Summary and Conclusion

The amount of blood lost during a surgical operation is usually more than that estimated by the surgical team. Unless this loss is properly substituted there is a risk of postoperative shock and prolonged postoperative morbidity. The degree of the shock depends upon the amount of the blood lost and its relationship to total blood volume. This loss should be replaced at the optimum time and with proper quantity.

The colorometric estimation of the blood loss during an operation affords a guide to the minimum blood to be replaced. This series of 26 cases gives an idea of the total blood lost during different kinds of operation. It also shows that the amount of blood lost in a particular operation does not differ significantly from hand to hand.

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SPECIAL ARTICLES

FILARIASIS IN TROPICAL ASIA

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Filariasis is an infection with nematode parasites of the superfamily Filarioidea (Weinland, 1858; Stiles, 1907). These parasites are generally known as filarial worms. The adults or parental forms are long and threadlike. They are characteristically tissue parasites inhabiting the lymphatic and circulatory systems, connective issue, and serous cavities of land vertebrates. They are particularly common parasites of birds and mammals and may cause serious disease in man.

The progeny of the adult worms are motile larvæ and, because of their minute size, are known as microfilariæ. These microfilariæ are deposited with or without periodicity by the female worms within the body of the host, and must escape through the skin during the feeding of a blood-sucking insect for further development and transmission to a new host. Whereas adult filarial worms are markedly host-specific, the ability of microfilariæ to develop in a wide range of blood-sucking arthropods, particularly mosquitoes, is a prominent feature of the group. The parental forms of most species of filarial worms infecting man have been studied by relatively few workers. They rarely enter in the diagnosis. Specific diagnosis is usually established on the morphological and biological characters of the microfilariæ.

Of the several species of filarial worms known to parasitize man, only two species of clinical and public health importance occur in Asia: namely, Wuchereria *bancrofti* (Cobbold, 1877; Seurat, 1921) and *Wuchereria malayi* (Brug, 1927; Rao and Maplestone, 1940).

Bancroftian Filariasis

The enormous enlargements of parts of the body, particularly of the legs and external genitals, so frequently accompanying bancroftial filariasis, were noted and much studied before the ætiological agent, *Wuchereria bancrofti*, was discovered. According to Menon (1935), the first and very good description of the affection was written about 600 B.C. by Sushruta in India. The disease probably was known also at the same time in Persia, Arabia, Egypt, and other parts of Africa.

Observations demonstrating the ætiology of elephantiasis were initiated in 1863 by the French surgeon, Demarquay, who found microfilariæ in hydrocele fluid of a resident in Cuba. Within the next few years, identical worms were reported in chylous urine and in the peripheral blood of patients from widely separated parts of the tropical world. They were

placed under the genus Filaria, a name established in 1787 and used by earlier authors in a very broad taxonomic sense. The adult female worm was discovered in a lymphatic abscess in 1876 by Bancroft in Australia. They were first described under the name *Filaria bancrofti*. The parasite was generally known by that name until about thirty years ago, when, because of morphologic differences, it was placed under a new genus, *Wuchereria*, which name had been applied to the parasite in 1877 by Da Silva Araujo in honour of Dr. Wucherer, a prominent physician and parasitologist at that time in Brazil. To-day the valid scientific name of the parasite is *Wuchereria bancrofti*, and infection with it is generally referred to as boncroftian filariasis.

The early studies on bancroftian filariasis culminated in the research of Patrick Manson in China. Early in his investigations Manson discovered filarial periodicity, and experimentally demonstrated that the mosquito, *Culex fatigans*, was an essential intermediate host and the common agent for dissemination of the parasite. Later investigations were largely directed along epidemiological and pathological lines.

Although bancroftian filariasis is widespread throughout the warm countries, it is a focal disease, and is neither evenly distributed nor uniformly prevalent in any country. It characteristically occurs in island populations or along more or less broad, low-lying coastal areas of the larger islands and continents. Indigenous infections are seldom to be found in the foothills or beyond coastal plains. This spotted and discontinuous distribution of the parasite within endemic areas is attributed to differences in local physical factors and sanitation, and to the presence or absence of favourable mosquito vectors.

In Asia, the parasite is established along the coastal areas from Arabia to the Shantung Province in Eastern China. It is prevalent throughout the islands of the East China Sea, southern Japan, southern Korea, and the Oceanic Islands. The disease has an extensive distribution in lower India, Burma, Thailand, Indo-China, Indonesia, Melanesia, and southern Polynesia. The most highly endemic areas are on the islands in the Western Pacific (west of 170°), particularly the Samoan, Ellice, Tokelau, and Fiji islands. Bancroftian filariasis is of little importance, and is probably seldom transmitted in Malaya. The few infections noted there have usually occurred in immigrants from India and China.

Within endemic areas, bancroftian filariasis is typically urban in distribution. It is restricted to a few towns or to sections of towns which are densely populated or poorly sanitated. It is particularly common in overcrowded dwellings of poor people, and the incidence and morbidity in a given family may be striking.

The adult worms are parasites only of the lymphatic system of man. They, like other nematodes, show marked sexual dimorphism; the male worm measures about 40 mm. in length and 0·1 mm. in diameter, and the female is at least twice as long. They may be found at any level of the lymphatic system, but occur most frequently in the limbs, scrotum, and inguinal regions. The two sexes are often coiled together in the periglandular tissues, the afferent lymphatics, and the cortical sinuses. In heavy infections they may also occur in the medulla. Probably they do not migrate.

The appearance of the microfilariæ in the peripheral blood is periodic in most parts of the world. They are characteristically present at night, but absent or rare in the daytime. They are found in greatest number between 10 o'clock in the evening and 2 o'clock in the morning.

We have no adequate explanation for this phenomenon (Lane, 1948; Hawking and Thurston, 1951). In the Western Pacific, however, the microfilariæ are nonperiodic, and remain at all hours in about equal numbers in the circulating blood.

The microfilariæ, as seen in fixed and stained blood smears, characteristically assume smooth, graceful curves. Each is covered with a hyalin sheath, which may extend some distance beyond the anterior and posterior limits of the body of the worm. The sheath is not apparent on the microfilaria in the circulating blood (Augustine, 1937). It is formed on the slide in the clotting and drying blood. The worm is mechanically held in the thickening medium; and in its efforts to push on and back out, its outer covering is stretched. The worm usually does not escape, and the covering is retained as a distinct outer membrane. While the nature of the sheath is essentially an academic question, its presence is of practical value, in that it forms a specific character in establishing the diagnosis (Fig. 1).

FIG. 1—*Wuchereria bancrofti*. MICROFILARIA × 840. THE SHEATH EXTENDS SOME DISTANCE BEYOND THE TIP OF THE TAIL. NOTE THE SMOOTH GRACEFUL CURVES OF THE BODY AND THE DISTINCT NUCLEI IN THE NUCLEAR COLUMN (Original photomicrograph from Giemsa-stained blood film received from the late Dr. F. W. O'Connor)

For further development and further spread of the parasite, the circulating microfilariæ must be ingested by suitable mosquitoes, the sole vectors of bancroftian filariasis. The factors which determine the suitability of particular mosquitoes are not known. Development takes place readily in mosquitoes of a variety of genera, including *Culex*, *Aëdes*, and *Anopheles*, but nearly related species within these genera differ widely in their ability to serve as hosts. For example, *C. fatigans* and *C. pipiens* are favourable hosts, whereas *C. vexans* is not; and *Aëdes polynesiensis* is also a very favourable host, but *A. aegypti* and *A. Albopictus* are not.

Metamorphosis and development of the infective stage for man take place in the thoracic muscles of the mosquito. Under highly favourable conditions the infective stage is reached after about 10 days, when it travels through the thoracic muscles into the interior of the labium, where it awaits an opportunity to get back to man, which is presented when the mosquito feeds. Unlike the development of the malaria organisms in the mosquito, there is no multiplication of filarial larvæ in the body of the insect vector. On the contrary, only a fraction of the number of microfilariæ ingested by the mosquito develop to the infective stage for man. It has been estimated that about 35 per cent of the microfilariæ ingested by the mosquito die in the stomach blood clot, and that a very heavy mortality of larvæ may also occur after their arrival in the thoracic muscles (O'Connor and Beatty, 1938). These worms are pathogenic in the mosquito. Many infected mosquitoes die during the first few days after an infective blood meal. At every step of transmission, only a relatively few parasites are involved. The transmission of bancroftian filariasis is therefore accompanied with much less certainty than that of malaria.

When the mosquito feeds upon a person, the infected larvæ escape from the distal portion of the labium of the mosquito and momentarily become free on the skin. They then actively enter the human host by penetrating the moist skin, entering presumably through the wound made by the mosquito, or through a breach in the skin.

Nothing definite is known about the larvæ after they enter a human host until they appear as adult worms in the lymphatic system. Judging from observations on a related species in the dog, *Dirofilaria immitis*, development of *W. bancrofti* to functional sexual maturity probably requires at least several months. For production of microfilariæ, it is necessary that worms of opposite sex come to lodge and develop together in the same spot. Successful infections, therefore, probably are in most cases the result of mass biting infected mosquitoes.

Despite positive statements in the literature, the host-parasite relationship in bancroftian filariasis remains largely an assemblage of ideas, and lacks experimental proof. Experimental proof, however, is difficult because man is the only vertebrate host of *W. bancrofti*, and no similar pathological changes have been associated with any known filarial species infecting lower animals.

Giant urticaria, abscess, myositis, lymphangitis, lymphadenitis, elephantiasis, hydrocele, lymph scrotum, and chyluria are the commoner and generally accepted signs in bancroftian filariasis. The manner in which the parasite produces disease is not clear. It is generally held that living microfilariæ are not pathogenic. Our own experiments have shown that these larval forms readily pass unharmed through normal lymph nodes (Drinker, Augustine, and Leigh, 1935). Direct observations have shown that they are exceedingly active in the blood stream. They are not only passively carried about with the blood stream but they also actively move against the blood stream in the arterioles, making slow progress by bracing themselves against the walls of the vessel. They frequently occlude the capillaries, and then suddenly break through the stagnated column of blood cells to re-enter the active circulation. They apparently never make permanent plugs or form emboli (Augustine, 1937).

In view of the fact that microfilariæ, in great numbers, are constantly being destroyed within the host, the possibility that at least some of the manifestations of bancroftian filariasis are allergic responses cannot be disregarded.

The serious disorders in bancroftian filariasis are usually attributed to the presence of the adult worms. O'Connor (1923, 1932), as a result of extensive studies on bancroftian filariasis in the South Pacific area and in the West Indies, was firmly convinced that dead adult worms—through aseptic degeneration and absorption—were chiefly responsible for the acute inflammatory processes which develop around them, and also for advanced pathologic changes. Here again an allergic sensitization to the worm's substance is assumed. More recently, Hartz (1944) contributed significantly to our knowledge of the histopathology of bancroftian filariasis. According to Harts, the living adult worm provokes dilatation of the parasitized lymphatic, and its subsequent occlusion and obliteration follow from a granulomatous mass of epithelioid cells within the duct and a perilymphangitis. In heavy and long-standing infections, extensive areas may be involved, resulting in complete obstruction of lymph drainage to a part, with development of lymphœdema and elephantiasis, due to subsequent extensive fibrous overgrowth. This sequence of events has been produced under experimental conditions by Drinker and Homans (1934).

Some authorities are of the opinion that *W. bancrofti, per se*, is not pathogenic. They are convinced that the pathologic manifestations usually associated with bancroftian filariasis, especially the attacks of inflammation, are caused by bacterial invaders. At the present time, however, it would appear that most authors lean toward the view that the parasites are responsible for the inflammatory reactions, particularly in the early stages. Some of the more serious later

complications obviously are due to or aggravated by secondary infection.

The symptoms of bancroftian filariasis can be divided into inflammatory and obstructive. The effects of inflammation are the first to appear; and these may include lympœdema, lymphangitis, lymphadenitis, funiculitis, epididymitis, orchitis, filarial fever, myositis, and abscess. Obstructive phenomena are the result of progressive inflammatory reactions. They include lymph varix, chyluria, hydrocele, and elephantiasis.

The early signs and symptoms of bancroftian filariasis are both vague and variable; but attacks of lymphœdema, lymphadenitis, and lymphangitis, of one form or another, are at present considered cardinal signs of the disease in endemic areas. The initial attacks may appear without warning and without apparent cause, but sometimes they develop following unusual exertion or exposure. Lymphangitis in bancroftian filariasis appears to be characteristically retrograde. The local symptoms usually are associated with varying degrees of generalized malaise, pain, numbness, fatigue, and a slgiht rise of temperature, which has been called "filarial fever." At the height of a severe attack, the entire arm or leg may become red, tender, and painful; but within the affected extremity there may be one or more areas, "focal spots," where the pain is especially severe. Both living and degenerate parasites have been found in biopsy material removed from such areas. The initial attacks usually cease spontaneously after a few days, but tend to recur after shorter or longer intervals. Symptoms of bancroftian filariasis in foreign residents may be complicated by psychic trauma, particularly fear of impotence or sterility.

In the obstructive phase of bancroftian filariasis, lymphatic dilatation without rupture leads to lymph varix. Lymph varices or varicose glands commonly occur in the skin, particularly on the abdomen, legs, or arms, in the groin, in the scrotum, the spermatic cord, and in the abdominal lymphatics around the kidneys and those of the bladder wall. Hydrocele commonly occurs in bancroftian filariasis. When not complicated by infection, the hydrocele fluid is clear, straw-coloured, and may contain microfilariæ. Lymph varices frequently develop spontaneously without local or general symptoms, and may become marked without the patient being conscious of them. Chyluria frequently develops upon rupture and drainage of a lymph varix into bladder or kidney pelvis. Here again the onset usually is abrupt, often without warning, but frequently preceded by pain in the kidney region. The urine may be chylous at one time but clear at another, depending on temporary closure of the ruptured lymphatic.

Elephantiasis is the most striking phase of bancroftian filariasis. The scrotum and legs are involved more frequently; the arms, penis, breasts, and vulva less frequently. Elephantiasis usually develops only after repeated attacks of lymphangitis. The process is usually slow, but in some cases enormous enlargements have developed within a few years.

The skin of elephantoid tissue in bancroftian filariasis, particularly the skin of the lower legs and feet, is characteristically dense and leathery, and, because of destruction of the sweat glands, is dry. It may be smooth and glossy, but frequently it is rough, warty, and nodular. Folds frequently appear, and deep abscesses may develop following abrasion and bacterial or mycotic infection.

The blood picture usually is not altered in bancroftian filariasis. Esinophilia frequently is present, but probably in most instances is related to concomitant helminth infection.

The absolute diagnosis of bancroftian filariasis usually is made on finding the characteristic microfilariæ in the blood. When obtaining blood for examination, the phenomenon of periodicity should be considered. Both day and night specimens should be collected. It should be remembered also that microfilariæ may not be present in the peripheral blood of many cases showing suggestive signs and symptoms in both early and advanced phases of infection, and that, therefore, negative findings do not necessarily rule out the diagnosis of filariasis. Conversely, the presence of microfilariæ does not necessarily imply filarial disease.

For the examination of blood for microfilariæ, six or eight large drops of blood are allowed to fall from the tip of the finger on to an ordinary clean slide and evenly spread before clotting over the surface of the side. The blood films are dried in a level position, protected from insects and dust, but freely exposed to the air. They are then dehæmoglobinized in water. When laking of the hæmoglobin is complete, the slides are examined while still wet under a low power of the microscope. The microfilariæ, if present, appear as glistening objects and are readily distinguishable.

For morphological study and identification of the microfilariæ, the dehæmoglobinized preparations may be stained with steaming Delafield's hæmatoxylin for 5 minutes and then washed with tap water. They should then be differentiated momentarily in acid alcohol, washed again in tap water until blue, dehydrated in absolute alcohol, cleared in xylol, and mounted in Canada balsam or any other satisfactory mounting medium.

If the above method fails to reveal infection, further search for microfilariæ should be made by using a method which will concentrate them. For such examination, about 10 ml. of venous blood should be withdrawn, laked, and centrifugalized at 2,000 revolutions per minute. The sediment is then transferred to a few drops of normal saline on a glass slide for immediate microscopic examination. The microfilariæ usually regain activity in the saline. The concentration method should be used in the examination of chylous urine for microfilariæ.

Search for adult parasites in biopsy material is not recommended as a routine diagnostic procedure. Adult worms usually are found in not more than 30 per cent of the cases. The histopathological changes within the node are suggestive but not specific for bancroftian filariasis. The finding of these changes usually has been considered confirmatory of the diagnosis in persons known to have been exposed to infection and in whom clinical symptoms are present, but actually it calls for further careful search for the worm in the excised material and for further search for microfilariæ in the blood.

Frequently the diagnosis is made upon the presence of certain symptoms when they are noted in natives or foreign residents in endemic areas. These symptoms usually are referable to the early stages, and include lymphangitis, lymphœdema, lymphadenopathy, myositis, and sometimes abscess. There is, however, considerable disagreement among authorities on just what should be included under "signs" and "symptoms" of bancroftian) filariasis. Lymphangitis, lymphadenitis, lymphœdema, and particularly permanent enlargement of the epitrochlear lymph node are considered by Buxton (1928) and others to be the earlier positive signs of the disease. Iyengar (1938), however, excludes the presence of enlarged lymph nodes, lymphadenitis, and abscess, because he could not determine to what extent they represented filarial disease; but he includes elephantiasis, lymph scrotum, hydrocele, and lymphangitis—particularly a retrograde lymphangitis. Buxton (*loc. cit.*) recorded hardness or enlargement of the testicle and epididymis and the presence of hydrocele as manifestations of bancroftian filariasis; but, finding it difficult to define a boundary between a normal testicle and epididymis and one that was enlarged or fibroid, he concluded that the male genitalia do not provide useful physical signs in the diagnosis of filariasis. Webster (1946), from a study of case histories of 80 adult white persons with an average duration of residence of 26 years in the Samoan Islands, and showing signs and symptoms of bancroftian filariasis, concluded that the mere presence of palpable axillary, inguinal, or epitrochlear lymph nodes is of little value in the diagnosis in areas where bacterial infections of extremities are extremely common.

During World War II, 10,421 cases of bancroftian filariasis were reported among U. S. Navy personnel, following service in the South Pacific areas, particularly in the Samoan Islands. The diagnosis in most of these cases was based upon (*a*) the presence of a transient retrograde lymphangitis, localized lympœdema, or lymphadenitis, (*b*) service leading to the exposure to infection, and (*c*) a positive reaction to an intradermal test.

To evaluate the importance of lymphadenitis in filariasis, a careful physical examination—with particular reference to the presence of palpable lymph nodes—was made on 200 men of the above group with a clinical diagnosis of bancroftian filariasis, on 271 cases of malaria, and on 98 men who had not been in tropical areas (Coggeshall, 1946). The data obtained from this study showed no significant differences, either in the number of men with demonstrable adenopathy or in the average number of nodes in any particular area. Patients in the overseas groups had larger nodes than those in the control groups, which differences could be accounted for by the existence of active fungus infections in the overseas group. Although lymphadenitis is usually considered to be the most frequent clinical manifestation of bancroftian filariasis, in the above study it could not be used as a diagnostic criterion.

There is close agreement among the authors that lymph varix, chyluria, and elephantiasis usually are indicative of bancroftian filariasis in the later stages, when occurring in natives and foreigners having had a prolonged residence in an endemic area. However, in view of the fact that typical cases of elephantiasis of a limb, and less often of the scrotum, occur in areas where the agency of filariasis can be excluded, not all cases of elephantiasis in the tropics, even in regions of high filarial endemicity, need be ascribed to *W. bancrofti*.

Various skin tests have been employed in the diagnosis of filarial infection. The number of positive intradermal responses following the use of nonspecific antigens in suspected cases of filariasis led to the conclusion that this test was of diagnostic value. Results of later applications of these tests, however, gave irregular and uncertain results. False positive reactions are believed due to cross sensitivity: i.e., a helminth group-reacting factor from nematode infections other than filarial worms and probably to immune responses produced by infective larvæ of nonhuman filarial species (Augustine and Lherisson, 1946). Unfortunately, immunological tests at present cannot be relied upon for final decision in the diagnosis of filariasis.

The only way of making a positive diagnosis of bancroftian filariasis is by identification of the infecting parasite, either adult worms or microfilariæ. The recognition and correct diagnosis of this disease, in the absence of demonstration of the parasite, usually is difficult and requires detailed study. Lymphadenopathy, lymphœdema, and lymphangitis always should suggest the possibility of bancroftian filariasis when occurring in persons living or having lived in endemic countries. Of these, the commonest and most characteristic initial manifestation of the disease appears to be an acute transient retrograde lymphangitis.

Chemotherapy in bancroftian filariasis is still in the experimental stage. Encouraging results, however, have been reported with drugs of the piperazine derivatives (l-diethylcarbamyl-4-methylpiperazine) known commercially as Hetrazan and Banocide (Kenney and Hewitt, 1949; Gailliard and Mille, 1949; Hewitt *et al*, 1950). The drug has a marked lethal effect on microfilariæ; it is relatively well tolerated in bancroftian filariasis; and has the added advantage of oral administration.

Palliative measures usually are recommended for the immediate treatment of acute inflammatory attacks. Rest usually affords relief. Pressure bandages are recommended in early elephantiasis of the legs. The large fibrotic tissues of advanced elephantiasis frequently have been removed by surgery (Knott, 1932; Lovell-Campbell, 1948).

At the present time there are two promising lines of attack against bancroftian filariasis. *Culex fatigans*, the house mosquito of the tropics, probably is the commonest vector in most endemic areas east of 170°. *Aëdes polynesiensis* is now the recognized vector of filariasis in the Western Pacific islands (Marks, 1951; Manson-Bahr and Muggleton, 1952), and *Anopheles punctulatus* is an important vector in the Eastern Pacific islands. Anti-mosquito measures—particularly house spraying with DDT and gammexane—may be useful, but confirmation is needed. There is great promise, however, in control directed at the human reservoir. Microfilaria carriers have been rendered microfilaria-free, and therefore noninfective to mosquitoes, for at least 14 months following a course of treatment with Hetrazan (Hewett *et al*, 1950). Treatment with this drug on a large scale may prove to be our most effective measure of control of bancroftian filariasis.

Malayan or Brug's Filariasis

Although the identity of the Western Pacific filaria was questioned, because of biological differences (Manson-Bahr, 1942; Lane, 1942; Baylis, 1942), it was quite generally accepted that throughout tropical Asia there was but one species infecting man: namely, *Wuchereria bancrofti*. In 1927, however, Lichtenstein discovered microfilariæ in blood films from natives of the Celebes which were morphologically distinct from those of *W. bancrofti*. They were studied by Brug (1937), who described them as a new species, *Filaria malayi*. The adult parasites were first discovered in 1940 by Rao and Maplestone in India, and again a year later by Bonne *et al* in Malay. The adult parasites are not readily distinguishable from those of *W. bancrofti*.

Endemic Malayan filariasis is limited to southern India, Travancore, the Central Provinces, Orissa; Ceylon; South-east Asia, including South China, Indo-China, the Federated Malay States; and Sumatra, Java, Borneo, Celebes, and New Guinea. There appear to be no authentic records of indigenous Malayan filariasis in Thailand, although the immediately adjoining district—Kedah, Malaya—was one of the first endemic areas known in Malaya. Whereas bancroftian filariasis characteristically occurs in urban communities, Malayan filariasis is essentially a disease of rural communities in forest settlements along rivers, in open and jungle swamps, rice countries, and in sandy coastal areas. The blood infection rate in children of the endemic areas is characteristically high (55 per cent in one of the Malayan *kampongs*).

Fig. 2—*Wuchereria malayi*. Microfilaria, × 840. Note Kinked Attitude and Smudged Appearance of Nuclei in the Nuclear Column
(Original photomicrograph from Giemsa-stained blood film received from the late Dr. Candito Africa)

The microfilariæ, as seen in stained blood smears, characteristically lie in kinked attitudes, lack the graceful sweeping curves of *W. bancrofti*, and have a smudged appearance due, apparently, to overlapping of the nuclei in the nuclear column (Fig. 2). One or two discrete nuclei are present in the tip of the tail, separated from the nuclear column. They may or may not be enclosed in their sheaths, and empty sheaths are usually found in the stained preparation. The microfilariæ show a considerable degree of nocturnal periodicity, with a peaking lasting from about 8 o'clock in the evening to about 2 o'clock the following morning.

Transmission of *M. malayi* in the endemic areas is mainly by mosquitoes of the genus *Mansonia*, sub-genus *Mansonioides*. The principal vectors include: *M. annulifera* in India; *M. longipalpis*, *M. uniformis*, and *M. indiana* in Malaya; and *M. indica* in Indo-China. Anopheline mosquitoes may also serve as intermediate hosts, but usually they are of secondary importance. However, *A. hyrancus* is an important vector in China, and *A. barbirostris* is the only vector and an excellent one in Celebes (Brug, 1937).

Mansonia mosquitoes are unusual, in that their larvæ and pupæ do not come to the surface of the water to breathe. They obtain their air by piercing the roots of aquatic plants and trees. Most aquatic plants with roots free in the water appear to be suitable, but the water hyacinth *Eichornia crassipes* and in floating plant *Pistia stratioiles* are among the more important.

The clinical features in Malayan filariasis are essentially the same as in bancroftian filariasis. However, in Malaya filarias, elephantiasis of the arm is rare. One or both legs may be affected, but the en-

largement characteristically stops several inches below the knee.

Wilson (1950) has demonstrated that Hetrazan rapidly removes microfilariæ of *W. malayi* from the blood, and apparently has a permanent effect on the adult worms. According to Wilson (1950), the disappearance of the microfilariæ from patients without clinical manifestations was accompanied by a sharp, febrile reaction, much more severe than similar reactions observed in infections with *W. bancrofti*. Patients with clinical filariasis of short duration, however, had little or no reaction to treatment, and general improvement in their physical condition was noted about a year later upon the follow-up examination.

Removal of the aquatic vegetation from open swamps or pools has been successful in reducing the number of vectors (*M. annulifera* and *M. indiana*) in some areas of India and in Province Wellesley, Malay. Such a measure is obviously not practicable in large jungle swamps, the breeding sites of *M. longipalpis*.

House spraying with residual insecticides holds promise in breaking the contact between man and the infected mosquito. Preliminary observations carried out in Malaya (Wilson and Reid, 1951) indicate that the local species of *Mansoni* are more susceptible to DDT than are other culicine mosquitoes. However, difficulties of the terrain usually preclude the use of insecticides against the mosquito larvæ, except on a limited scale in coastal endemic zones. But the outlook is encouraging, particularly if chemotherapy can be developed for use in extensive control projects. Unsupervised mass treatment with Hetrazan, however, is not considered practicable in Malayan filariasis owing to the marked clinical reactions which are likely to occur in the microfilaria carriers.*

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*The suggestion for control of filariasis is, however, open to controversy. Control by medicine of a disease where only a small portion of the affected people are carriers can hardly be considered superior to the vector control which is a more practical method and has collateral benefits—Ed., *J. Indian M. A.*

GYNAECOMASTIA

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Gynæcomastia is a condition in which the male breast becomes enlarged approximately to the size of the ordinary virgin breast. This enlargement most commonly affects only the stromal tissue. But it is occasionally seen that such enlargements even lactate. In association with this unfortunate anomaly, neurosis frequently develops and the sex-organs may be underdeveloped. The condition was first described by Paulos of Aeguia many centuries ago.

In earlier writings on the subject three stages or rather types were described—

(1) Adiposomastia.
(2) Gyanæcomastia (true).
(3) Lactating gynæcomastia.

This classification, however, does not indicate the ætiology of the condition. So it was discarded and the following classification was suggested:

(*a*) Deep constitutional gynæcomastia of hypertestosteronic type.

(*b*) Hypotestosteronic type gynæcomastia.

(*c*) Cortilactinic and prolactinic gynæcomastia.

(*d*) Psychopathogenic gynæcomastia.

Hypertestosteronic Type

This is due to defective organic substance for the breast, or due to abnormal reactivity of the breast to normal male sex hormones.

Seyle has shown experimentally that both œstrin and testosterone can stimulate the breast development. —a fact corroborated by clinical demonstration and by the occasional occurrence of gynæcomastia in persons undergoing testosterone treatment for some other conditions such as enlarged prostate or hypogonadism.

This type of gynæcomastia is not as common as the following one.

Hypotestosteronic Type

This is the commoner type and constitutes about 70 to 80 per cent of the cases met with. In this the gynæcomastia is a part of the Babinizki-Frolich syndrome, in mild or severe form.

Babinzki-Frolich syndrome.—This is a syndrome in which there is a mixture of both masculine and feminine sexual characters. This syndrome is supposed to result from the dysfunctioning of the pituitary gland. The main features are buffalo type of adiposity, affecting the arms, legs and trunk, with a tendency to somnolence (fat boy of Dickens)—wide subpubic angle (gynæcoid pelvis), absent Adam's apple—with other features of hypogonadism, such as cryptorchidism, hypospadiasis, etc. The penis may be so small that it may resemble the clitoris and the median raphe of the scrotum may be deeply cut. This syndrome results from the lack of testosterone (androgens) by the hypofunction of the pituitary either due to tumors or atrophy. There is slight alteration in physiological data of the subjects also. The blood pressure may be slightly raised; the temperature is slightly subnormal; the sugar tolerence is increased. Intelligence may be normal but the libido may be feminine and an introvert attitude may be presented by the person.

Lack of gonadotrophic hormones from the pituitary and/or overproduction of œstrogen such as in conditions like choronic epitheliomas and teratomas of the testes, may also be responsible for the syndrome and gynæcomastia.

It is believed that the liver has œstrinolytic and testosteronolytic properties in the males and females respectively. So certain cases of long standing cirrhosis of the liver show a marked tendency towards enlargement of breasts. In such cases it is believed that the liver fails to destroy the œstrogen normally produced by the male. It is well known—and experimentally proved that both the sexes produce both hormones but in different proportions. And it is the proportion of each hormone produced that determines the sex and the primary and secondary sexual characters.

Cortilactinic and Prolactinic Type

This is supposed to result from the excessive production of cortilactinic hormone from the adrenal cortex and the mammogenic from the anterior pituitary body. In these cases the glandular structure is well developed in the breasts and they may even lactate.

Psychopathogenic Gynæcomastia

This is an interesting group from the psychologist's point of view. In this the main factor is the environment and upbringing of the subject in the early childhood. It is definitely proved that at birth and upto five years a child is narcisistic and ambivalent regarding libido and sex. It is maternal suggestion and association of the child with its like that leads to the formation of a masculine or feminine complex. Of course, the chromosome (XY or XX), factor is there to give the fœtus, the child an innate disposition to be more susceptible to certain types of environmental conditions.

It is discussed by La Grosclark that there are some nerve connections between the pituitary and the hypothalamus. Thus emotions, environment, circumstance and dressing and the attitude of the children and also the suggestions of the mother have a contributory effect on the stimulation or depression of the pituitary and thus may either enhance or inhibit the production of different hormones.

There is in fact a reciprocal response between the pituitary and the hypothalamus. Thus we can also assume that while the thoughts influence the produc-

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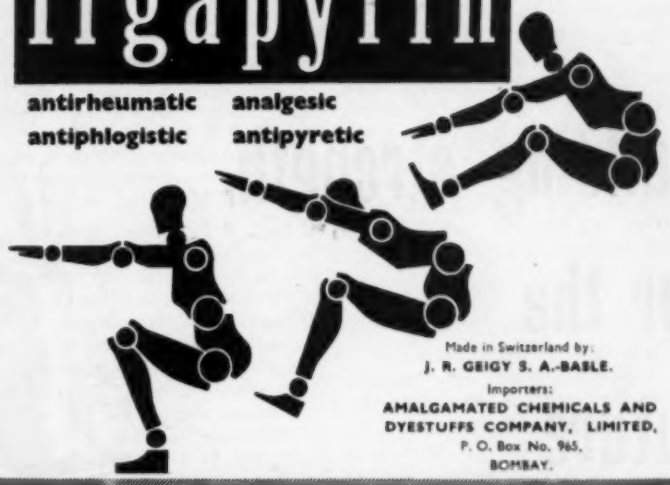

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tion and inhibition of hormones, the excessive or deficient production of hormones may in turn be responsible for the changes in attitude and disposition of the subjects.

Investigations in a Case of Gynæcomastia

(1) *Age*—The condition is more commonly noted at about puberty and is assocated with a lot of anxiety—so much so that the subjects may shun society and friends. In older persons of about fifty years of age, the psychological factor is not important and the general investigations about the cases are in need. In young gynæcomasts a thorough psychological examination will not only help to understand his condition but also may go a long way in breaking vicious cycle.

(2) *Psychological Investigation*—The early part of the childhood of the subject and his attitude (introvert or extrovert) must be made out. His inclinations and opportunities must be thoroughly (as far as can be) investigated; his parts in dramas—and the like instances recorded; any instances of masturbation etc. noted; his liking for different types of dresses and games also may be noted with advantage. Thus tactful questioning, sympathetic attitude and perseverance on the part of the doctor may result in a better understanding of the subject. This may not be as easy as written or told. The subject due to the unfortunate condition suffers a certain amount of shyness and anxiety. He might even attain a neurotic personality. But the doctor with patience and tactful and sympathetic questioning must break through the thick veil of the subject's neurotic personality.

(3) *Urine examination for Aschheim-Zondek test*—Ferguson has noted presence of gynæcomastia with secretion of colostrum in fifteen among 117 cases of testicular tumour, in which he examined urine for excretion of gonadotropin. The following table indicates the comparison of mouse units of gonadotropin in certain conditions.

Condition	*Mouse units of gonadotropin in urine litre*
Normal ...	... 50
Teratoma ...	... 50—10,000
Chorionepithelioma	... 10,000, 150,000 units or more

The above figures justify the examination of urine for gonadotropins (Aschheim-Zondek's pregnancy test) particularly when the gynæcomastia is associated with a tumour of the testicle.

(4) *Liver function tests*—As gynæcomastia is occasionally seen in cases of chronic hepatic cirrhosis, when a tumour of the testis or cryptorchidism is not present, liver function tests might prove of some use. There is a lot of scope for research workers in this field.

(5) *Testosterone test dose—reaction*—A testosterone test dose may be given orally or intramuscularly and the response of the breasts (increase of tenderness) may be noted. If there is increase of breast and tenderness then most probably the condition may be a hypertestosteronic type and may not respond to androgen therapy however long it may be continued.

(6) *Exclusion of Babinzki-Frolich syndrome*—Slightly above normal blood pressure, increased sugar tolerance and subnormal temperature associated with adiposogenitalis and buffalo type of fat distribution are diagnostic of the syndrome. A routine investigation of sugar tolerance, temperature and blood pressure taken five or six times in a week may help.

(7) *Physical Examination*—Above all these, thorough physical examination is very important. Genitals must be carefully examined for hypospadiasis or other abnormalities. The size of the scortum, the median raphe, the testis and the epididymis and the vas deferens should be carefully examined for tumours etc.

Treatment

Considering the ætiology of gynæcomastia and its different types, the condition may require, psychological, medical and surgical treatment.

Psychological treatment—It has been made clear that a gynæcomast gradually develops a neurotic personality—this surely is detrimental to his general condition and is a formidable hindrance to medical therapy. This is more so when the subject is between 15 and 30 years of age—or at the age of puberty. That is why quite often the androgen therapy, fails between these ages. Occasionally it is seen that cases of gynæcomastia developing at the age of puberty is amenable to treatment by suggestion. Sympathetic and patient explanation by the doctor—analysis by free association method or even suggestion under hypnosis by a medical hypnotist may achieve a formidable success. Even pentothal analysis may be used to convince the patient that the condition is not serious and that it is not progressive but it subsides by itself, and if handled expertly an extrovert attitude towards environment may still be developed.

Medical treatment—Most of the cases of gynæcomastia belong to the hypotestosteronic type and hence after at least one or two test doses of testosterone, one may resort to androgen therapy (either parenteral or oral).

Parenteral.—Testosterone propionate—test dose:

5 mgm. I. M.—If there is an increase of tenderness or further enlargement of the breast—discontinue androgen therapy. If no response the dose may be gradually increased daily by 5 mgm.—acquiring a daily dosage of 25 mgm. and this should be maintained for months.

Oral—Methyl testosterone linguets may be given in doses of 10 mgm. to 100 mgm. daily.

Other substitutes are the polyglandular extracts for males. I think before trying the testosterone therapy one must try the polyglandular extract therapy.

Surgical treatment—When the condition of gynæcomastia is the result of teratoma or chorionepithelioma of the testis, then a radical orchidectomy on the side of the tumour supplemented by postoperative testosterone therapy is indicated.

But when the medical and psychological treatments do not suppress the condition (even when there is no tumour associated with testis) the patient will have to be subjected to surgical measures i.e., mastectomy. Certain principles of mastectomy should be observed.

(1) If the condition is bilateral—small but adequate and symmetrical incisions must be made.

(2) Nipple in all cases may be saved.

(3) Glandular tissue must be completely removed.

But both preoperatively and postoperatively testosterone treatment and psycholcgical treatment must be maintained. Because, I strongly believe that it is not the condition itself but the patient's attitude towards it that is harmful and depressing.

MEDICAL EDUCATION

MEDICAL EDUCATION AND CLINICAL RESEARCH IN INDIA

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There is no denying the fact that the system of medical education and training that our undergraduates receive at present in our teaching hospitals and the work they are called upon to do when they settle down to practise in the country have very little in common. Our medical students are trained in well equipped hospitals attached to medical colleges where almost every difficult case goes thrcugh a diagnostic cycle in which the radiologist, the pathologist, the biochemist and other specialists come into play, each contributing his share in a combined effort to arrive at a correct diagnosis. Students naturally get used to this system and develop the habit of waiting for the x-rays and the reports. As every investigation is done for them easily by experts they have no desire or inclination to do anything themselves. Their powers of observation, curiosity and sensitiveness of touch and hearing are not stimulated, while the personal contact with the patient is almost completely lost. Most of their time is taken up in gathering up and remembering facts and figures and getting a superficial acquaintance with the latest specialities and technical achievements. So long as they are in the training hospitals they feel quite at home, but once they pass out and settle down in the country to practise, they find themselves in a completely different atmosphere and set up, unsupported and left alone to make a diagnosis with no aids other than their ears, eyes and hands. A suspected early lesion of the lungs which all through their undergraduate study needed only a note to the radiologist for diagnosis, has now to be elicited by careful questioning of the patient, close observation, palpation, percussion and auscultation. They are practically forced to start all over again and develop their own method of diagnostic procedure.

There is no trained nurse or ward boy to receive orders and the young doctor finds to his confusion that he is called upon to carry out himself many essential items of treatment which in the training hospitals were the special responsibility of the nursing staff and which as a consequence he had completely neglected.

Clinical research as part of the activities of a medical college and training hospital is neither sufficiently appreciated nor enforced in India. It is looked upon as something superfluous or ornamental—good if you have it but in no way essential or necessary, and in matters that count carries little or no weight. The result is obvious. With all the wealth and variety of clinical material in our big teaching hospitals attached to medical colleges, the quantity and the quality of clinical research carried out is neither impressive nor adequate. Even in diseases that abound in Indian soil like malaria, tuberculosis and filariasis, we have shown little originality or initiative in approach or outlook but merely wait for ideas from outside for any new move.

Nobody doubts the capacity or intelligence of medical men in India. Why is it then that most of them lack the inspiration and impetus for research work. I am inclined to think that the defect lies in the system of medical education and training and not in the men or material. The following few ideas are presented for the kind consideration of those who are at present engaged in the reorganisation of medical education in India.

Every medical student must be made to attend hospital from the very first day of his joining the medical college. He may not be knowing anything of medicine or surgery or anatomy or physiology but he can watch and observe the patients allotted to him and their progress day by day. This mental impression of diseases correctly diagnosed by senior experienced physicians and surgeons and their progression towards recovery or death will be of inestimable value to him in after-life, and there is no valid reason why a student should be denied this opportunity during the first two years of his medical study. As he progresses in his knowledge of anatomy, physiology and pathology, the meaning and significance of these impressions will become clear and fixed in his mind. During this period he must be taught the elements of nursing and under the guidance and direction of the sister in charge of the ward he must do every item of nursing treatment to the patients allotted to him. Dissection and practical classes and lectures can be held after 1 P.M. as in the case of the clinical subjects at present.

Every professor and assistant in a medical college should have collateral work in the attached hospital. The present division between clinical and non-clinical teachers should be abolished. This is sure to bring about a very healthy change in medical teaching. At present there is a growing tendency for non-clinical subjects to break loose from medicine and develop an autonomous and independent growth. This is bound to happen, as non-clinical professors having no contact with patients gradually cease to be doctors, get engrossed in their own subjects and teach them to the students as though they are an end in themselves. There is nothing to make them realise that the prime objective of the whole course of medical study is the understanding, diagnosis, cure and prevention of disease processes and every subject taught is contributory to this cause. Only the constant contact with disease processes and patients in the wards will bring about a change in attitude and outlook and make them more interested in the pressing problems of practical medicine. All through their five years' course medical students will, therefore, be working by turns under every professor in the wards of the hospital, and receive by the bedside of the patient a comprehensive view of disease processes where every aspect is stressed by different professors—differential diagnosis and treatment or pathogenesis or derangements of function. This will also overcome the present day tendency of the student to get rid of the subjects one by one as so many hurdles, and bring about a coherence and inter-dependence of all the subjects that a medical student is taught.

The focus of clinical teaching must shift from the in-patient to the out-patient department of the hospital. The vast majority of the common ailments which a general practitioner or family physician has to tackle present themselves only as out-patients; So also the early and incipient stages of serious diseases as cancer or tuberculosis. Special importance and stress must, therefore, be given in the diagnosis and management of these conditions. Except very serious and acute cases needing urgent and immediate attention, every other case on registration at the out-patient must be alloted to different batches of students in separate cubicles for eliciting the history, examination and provisional diagnosis. With an attached clinical laboratory almost every essential examination of urine, stool, blood and sputum can be done by them under the guidance and direction of the clinical pathologist. These cases will then be presented by the students to the physician or surgeon for confirmation or correction of their findings and diagnosis.

It is agreed on all hands that there is great scope for improvement in the working of the out-patient departments of our teaching hospitals. More hours must be given to out-patient work and all the physicians and surgeons must attend on out-patients every day. Thus greater attention and more time can be bestowed to each individual patient. With an efficient out-patient department many of the cases at present admitted can be effectively treated there and the congestion in the wards will be relieved.

Importance of clinical post-mortem examinations. The great educative value of clinical post-mortem examinations is not sufficiently appreciated in our medical colleges. Autopsy is an exclusive privilege to be taken full advantage of during the medical course. Once the students pass out and leave the medical colleges and teaching hospitals, few of them will have a chance of such a study and check up on their diagnosis. As it is, autopsy is attended by third and fourth year students who are posted for the work. Final year students and doctors who have seen, examined and diagnosed the cases do not usually care to attend; so, very often it happens that those who attend the post-mortems have not seen the patient alive, while those who have seen and examined him are not at the autopsy. Thus autopsy loses its importance and corrective value and becomes just the usual routine duty of the pathologist. *It must be made compulsory that every physician and surgeon must lead his team of assistants and students to witness every case of post-mortem from his wards.*

Every medical student must work in a village for a specific period. During the course of his medical study every student must be made acquainted with the medical and public health problems of a village. This is better done during the fourth year under the guidance and direction of the professor of preventive medicine. A village close by is selected to which these students are taken at least once a week. They make a close and detailed study of water supply, sanitation, common prevailing diseases, their cause and prevention. In the course of the year they make their report and recommendations of health measures to be undertaken and improvements made in the village and as far as possible carry them out themselves. This will give the students a more realistic idea of preventive medicine than class room lectures with toy huts and models.

Full-time teachers in medical colleges should not have private practice. If clinical research is to develop and flourish in India, this is an essential pre-requisite. No professor with an extensive practice can devote time and attention to research. He has to choose one or the other. Every professor in a medical college must be engaged in some form of research as part of his duty. This will naturally inspire and guide his assistants and students. At present this inspiration and guidance is completely lacking. If only clinical professors can find time and energy to study, analyse and follow up their own cases, we can gather a wealth of information and data which can form the basis of books reflecting Indian conditions and diseases common in India. At present, the vast majority of the books used by medical students are by English or American authors and very often even our professors in medical colleges dictate facts and figures to students *verbatim* from these books without caring the least to find out whether they hold good and true in our country.

PUBLIC HEALTH

AN EPIDEMIC OF ENTERIC FEVER IN SATARA TOWN

(Bombay State)

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Satara town has a borough municipality with about 45,000 population while Satara cantonment which adjoins it has a population of about 3,000. Sporadic cases of enteric fever occur every year in the town.

During the year 1950 in the early part of the month of June, a report was received from a social worker that a large number of cases of fever were occurring in Satara town. It was suspected that these were cases of enteric fever, but some of the local doctors thought it otherwise. On carrying out personal investigation from house to house, we observed that these clinically appeared to be cases of enteric fever. This diagnosis was further confirmed bacteriologically by testing samples of blood from a number of cases (17 in all) at the Haffkine Institute both serologically and by culturing, when *B. typhosus* was isolated.

Satara town has a piped water supply and the water is regularly chlorinated. A small part of the town at one end comprising 2 localities has a separate water supply. This is also chlorinated. In addition Satara cantonment has its own water supply purification plant and distributing system and the water is regularly chlorinated. The raw water to this plant is supplied from the same source as that supplying the Satara town. Drainage system is by means of open gutters and latrines are of basket type. Night soil is collected and emptied from iron receptacles by manual labour into night soil carts which ultimately take it to night soil depot outside the town for composting.

Epidemiology—There were in all 138 cases of enteric fever and 7 deaths amongst them between 1-6-50 and 21-7-50 in the town, as obtained from information gathered from the local practitioners and also by house to house visits by the Public Health staff of the Municipality and of the Government. Of these 89 attacks and 4 deaths were among males and 49 attacks and 3 deaths among females. The highest number of attacks occurred in the younger age groups viz., between 6 to 10 and 11 to 29 in both the sexes and case mortality in the female sex was slightly higher than that in the male. The youngest to have an attack was 2½ years old while the oldest was 48. On the whole the epidemic was of a mild type with preponderance among children and young adults. None of the attacked were inoculated previously. There were multiple cases in 7 houses. In one house there were 6 cases, 3 cases each in 3 houses and 2 cases each in 3 houses. The rest occurred singly. The cases represented all communities.

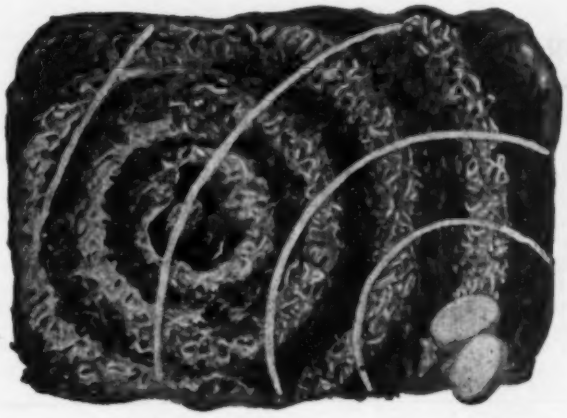
The source of the initial infection could not be traced. However, a carrier or an ambulant case seems to be the likely source in view of the prevalence of typhoid fever in a sporadic form in the town. Cases occurred in a scattered manner throughout the whole town. Higher number of cases occurred during the 3rd and 4th week of June when there was a sudden steep rise and thereafter the incidence declined rapidly. On investigation, it was noticed that these cases occurred in the area that was supplied by the main water works of the town. A small part of the town which was supplied by water from another source had only one case and the cantonment area which had its own water arrangement did not have any at all. This gave a strong suspicion that the infection was most probably water borne and was due to faulty main water supply of the town. Analysis reports, both chemical and bacteriological, during this period revealed that though the water was properly sterilised in the reservoir and gave satisfactory results there, the samples taken at the same time from taps in the different localities in the town indicated organic pollution on chemical and bacteriological analysis. No attempts were made to isloate *B. typhosus* from water. It was observed that the water works of the town were very old and the old pipes in many cases were laid through the open gutters of the town and hence chances of pollution from leaks in the old rusty main pipes were considered very likely. The milk supply of the town was from neighbouring villages from different sources in different localities and the milk was boiled customarily before its use. There was also no undue fly prevalence. These were therefore not considered to have any important part in the spread of the infection. Results of analysis of cantonment water supply gave satisfactory results both at the water reservoir and at the taps in the houses in different localities throughout.

Clinical Signs and Symptoms

In many cases the usual headache and the continued type of fever for a period of from two to three weeks showing a temperature of 102° to 103° with a mild to moderate toxæmia were present. Tympanitis was a common feature. In some cases the fever was of irregular type not showing the classical step-ladder rise, and only in a very few cases serious complications like hæmorrhage, pneumonia etc. were noticed.

Treatment

Most of the cases were under the treatment of local practitioners while some were treated at the Civil Hospital. Besides usual symptomatic and supporting treatment specific treatment by chloramphenicol was given in serious cases. The Municipality at our suggestion provided chloramphenicol treatment free to the poor patients who were in need of it. It was given in the



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patients' houses by the local practitioners concerned under whose care the patients were treated and in some cases at the Civil Hospital.

In all 16 serious cases were treated with chloramphenicol with two deaths one of these deaths occurring in a girl, 5 years old, who got collapsed after receiving treatment for 24 hours only when the temperature dropped to subnormal level and the patient's condition worsened ending later in a fatal result. As this patient was unable to continue the drug by mouth due to nausea and vomiting, no more than one capsule of 250 mgm. was given per rectum in the next 24 hours. It is difficult to arrive at a conclusion as to whether the collapse was due to effect of the drug causing sudden lysis of organisms and thus releasing a large amount of toxins in the circulation or whether it was due to the disease itself. The second death was in an adult and due to complication of bilateral pneumonia. In all other cases the temperature came down to normal in about 2 to 3 days' time.

Control Measures

Besides offering usual typhoid inoculation and carrying out concurrent and terminal disinfection and propaganda by means of pamphlets and cinema slides as regards personal hygiene, proper and prompt disposal of the excreta and refuse, the strict enforcement, under the special powers given to the Municipality, of the bye-laws as regards hotels and eating houses and notification of enteric fever. Compulsory isolation was not enforced but when this was not possible to do in the homes, facilities were provided for treating the patients at the Civil Hospital.

In addition the drinking water was treated with an adequate dose of chlorine so as to show a trace of residual chlorine at the water taps in different localities. Water at the taps was daily tested by the Sanitary Inspector for the presence of residual chlorine.

The outbreak soon came to a close after the above measures were taken and there were very few cases in the latter half of July and onward.

Summary and Conclusions

1. An epidemic of enteric fever in Satara town with 138 attacks and 7 deaths is described.

2. The incidence was preponderant among children and young adults and the case mortality was low.

3. There was evidence for the belief that the spread of epidemic was mainly waterborne.

Acknowledgment

We are thankful to the general practitioners of Satara town for their full co-operation in giving details of cases under their treatment and to the Civil Surgeon, Satara. We also thank the President, Chairman Sanitary Committee and Members of the Satara Borough Municipality as also their Chief Officer for their willing co-operation and interest taken.

We are also thankful to the Director of Public Health for his interest and encouragement in carrying out this investigation.

CASE NOTES

RECURRENT SYNOVIOMA

MAN MOHAN SINGH

AND

GURBACHAN SINGH

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Two varieties of synovial tumours have been recognized—the moderately common benign group and the rare malignant type. The synovial tumour in the case described here belongs to the second variety, although on the histopathological examination two years ago, it was placed in the former group.

Clinical history—B. S.—A man of 60 years of age, was admitted in West Surgical Ward of the local V. J. Hospital on 20-1-49 with a complaint of an ulcer on the medial surface of the lower part of the left thigh just above the knee, of 1½ years' duration. According to the patient, to start with, there appeared a small swelling of the size of a berry which gradually increased to the size of a cricket ball and the feel became firmer. It was incised by a barber, when it was 5 months' old, but only a little blood came out. As the wound did not heal, he underwent an operation by some doctor who seemingly removed the entire growth. After sometime the wound closed and the patient had no complaint for 2 months, when a similar swelling appeared again, gradually increasing in size as before. After a few months, the swelling burst through the skin and lot of thick blood stained matter was discharged, resulting in a deep punched out ulcer, which filled up gradually. The swelling was never painful. No difficulty in the movements of the left knee joint.

Local Examination revealed an ulcer on the medial side of the left thigh just above the knee—$1\frac{1}{2}'' \times 1'' \times \frac{1}{2}''$, oval in shape with clearcut margins, and the floor showed dirty granulations with seropurulent discharge. The area around the ulcer extending ¼" was found to be swollen and firm and the swelling was free of the skin and the underlying tissues. Movements of the knee were unrestricted.

Laboratory and x-ray examinations revealed no abnormality. The biopsy report was "acute inflammation." On 16-2-49 the ulcerated growth was scooped out, lot of friable tissue was removed and the margins were excised. The histopathological report on this tissue was—"Inflammatory reaction with many plasma cells".

After about a fortnight the excavated area again began filling up and after another fortnight it reached the level of the skin and the granulations began protruding out, discharging a little blood and pus.

On 5-4-49 the patient was again operated upon, the whole of the growth was excised *en masse;* while enucleating one of the portions was found attached to the tendon of the adductor magnus and it looked as if the growth was arising from it, the connection was snipped. The histopathological report on this tissue was 'endothelioma' (benign synovioma).

On 31-4-49 the patient was discharged from the hospital after the wound had healed up.

The patient got readmitted in the same ward of V. J. Hospital on 7-2-52 with the complaint of swelling of 6 months' duration at the same site, increasing in size gradually with an occasional feeling of pain in it shooting down to the foot,

On 3-3-52 local excision was made. There was a mass of growth under the muscles of the medial side of the left thigh just above the knee and it was infiltrating all round, hence it could be removed only incompletely. Amputation was advised, to which the patient did not agree. On 18-3-52 the patient left the hospital.

The following was the report on the tissue sent for histopathological examination on 3-3-52:

Morbid Anatomy—A soft mass, irregular in shape, 4" × 2½" × 2", dark brown in colour.

Cut surface light brown in colour and somewhat gelatinous. Mucinous material could be pressed out from it.

Histology—The sections under low and high powers show the tumour to be a somewhat cystic growth of pseudo-epithelial structure containing gelatinous secretion. The cells seen are either stellate cells separated by intercellular, mucinous material (Plate II, Fig. 1), or in other sections there are polyhedral cells of variable thickness and appearance forming cystic spaces containing similar material (Plate II. Fig. 2).

These cells give pseudo-epithelial appearance superficially resembling papillary adenocarcinoma, but on examining carefully one can see the nonepithelial character of the cell layers. These cells do not possess proper basal border, they rather merge with the diffusely arranged surrounding cells.

The amount of diffuse, cellular tissue was small in the sections prepared from this growth and could be seen only at a few places.*

Discussion

The tumour thus presents the characters of cystic growth of pseudo-epithelial structure, which is a variety of the malignant synoviomata, although the two varieties i.e., (*a*) solid anaplastic spindlecelled or pleomorphic-celled sarcoma in which synovial differentiation is lacking and (*b*) cystic or papillary growth of pseudo-epithelial structure, often containing gelatinous synovial secretion, are probably not distinct, but represent merely the more or less anaplastic tumours of one kind which in this case is predominantly of the latter variety.

Other cases reported, of the malignant variety, were not usually of this type. Wright (1949) reported a case of synovioma of rapid recurrence, which on histopathological examination proved to be a giant cell synovioma undergoing malignant change, showing extensive areas, devoid of giant cells; containing only diffuse cellular tissue with few patches of foamy cells accumulation. The site in this case was the hand. Berger (1938) had also previously surveyed the literature of xanthomatous giant cell synoviomas and recorded a tumour of this variety only, which turned out to be malignant.

De Santo *et al* (1941) in a study of 16 cases of synovial sarcoma, described three cases in them all associated with the knee joint, one of which showed the same kind of histopathology as that of the case under report i.e., atypical cells varying from spindle to polyhedral cells and having ill-defined cell outlines. The course of the disease—the local recurrence and appearance of metastases—was also similar.

In another case (Stewart, quoted by Willis, 1948) the growth involved the popliteal space and was invading the muscles.

Harris (1948) reported three cases of synoviomas out of which one died of metastases in the lungs and abdominal glands, the site in this case was high up on the anterior internal aspect of the right thigh, the mass being fixed up in the adductor group of muscles. The other two cases could not be followed up.

Stewart and Wright (1949) reported a recurrent benign giant cell synovioma of flexor tendon sheath of the hand, which even after 34 years, remained benign.

The purpose of reporting this case is that synoviomata are not very common, especially the malignant variety is much less reported, as the growth which looks benign on the first histopathological examination, may turn out to be malignant if the cases could be followed up for a longer period, which is sometimes difficult in this country. The case reported above, had a recurrence of growth three times locally, while the metastases in the lungs were detected after the last recurrence only. The period from the start of the growth and the appearance of metastases was about 3½ years.

Acknowledgment

Our grateful thanks are due to Dr. Yudhvir Sachdev, M.S., Visiting Surgeon, for allowing us to report this case and affording us all facilities to complete the records.

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* Only the last histopathological examination i.e., on 3-3-52 was made by the authors.

TWIN PREGNANCY IN BICORNUATE UTERUS

S. A. BHAGWAT, L.C.P.S.,
Hubli, Dharwar

Mrs. P. D., 7th para, came from a distant village for consultation on 13-4-52. She gave history of having given birth to a child 20 days ago and there was still a big lump in the abdomen about which all her relations were afraid.

Examination per abdomen showed that the lump was a gravid uterus and fœtus was alive. The size of the uterus corresponded to one of 28 week's gestation. The last labour (20 days ago) was considered to have taken place in the 7th month. The baby had died on second day.

The vaginal findings were as follows:

There was some lochial discharge. The cervix was thick, soft and patulous admitting two fingers. Inside it there was a septum. Still higher were two separate internal os uteri; one leading to the head of the live fœtus on the right, and the other to an empty uterus on the left side. The empty uterus contained some clots. On speculum examination nothing could be seen except the thick cervix.

On the evening of 19-4-52 she went into labour. The delivery was complete within two hours. The baby weighed

3¼ lbs. It looked thin, cried well and took to feeds normally. It was alive for 12 days, i.e., until she was discharged from the hospital. Examination before the patient left hospital showed two uteri attached to a single cervix. The cervix had closed by that time.

The interesting features in the case were—

1. The two labours taking place at an interval of 26 days. After the first labour at home, a doctor was called on the third day, who gave some injections for the labour to come on again. But the pregnancy continued inspite of them. A diagnosis of a double uterus was probably not made. Placenta prævia was suspected.

2. She had six previous normal labours all with live children. There was no history of twin pregnancy or abortion.

3. A diagnosis of a double uterus was clinically possible only because of the stage in which she came. Otherwise, the double uterus would have been easily mistaken for a fibroid of the uterus or an adnexal swelling like ectopic gestation.

A LIPOMA IN THE LUMBAR REGION

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Deolali Cantt.

Patient H., female child aged 3 months, well nourished, perfectly healthy and normal in other respects.

Complaints—The patient was observed at birth to have an appendage about 1½ inches long growing as it were, from the spine in the lumbar region. In three months the appendage had grown to twice its size and length and the rounded base became markedly prominent. No pain, tenderness on pressure, or other inconvenience detected.

Physical examination—There was a soft roundish swelling in the middle line of the spine at the site of lower lumbar vertebræ. A fleshy appendage of the thickness of an adult middle finger and tapering to a point, about three inches long was hanging from the swelling giving the impression of continuity of structure and origin. The swelling itself was soft and pulpy in feel, round in shape, with a diameter of about 2 inches, and the appendage appeared a clearly defined continuation of the rounded mass. The overlying skin was thick and free (Fig. 1).

FIG. 1—PHOTOGRAPH OF THE PATIENT BEFORE OPERATION

Diagnosis—No fluctuation could be elicited. The soft feel was more like a fatty tumour. The swelling had grown in size, it did not pit or disappear or diminish on pressure.

A provisional diagnosis of *"lipoma"* was made. The point of interest in the differential diagnosis was the situation, size, shape, and the feel, and agreed with the pointer by Rose and Carless that such tumours simulated "In some cases by its shape a caudal appendage."

An immediate operation was decided upon.

Operation—Under general anæsthesia (chloroform by the open method) the swelling was explored by an aspirating needle and hypodermic syringe. No fluid being touched, an elliptical incision half an inch round the base of the appendage was taken and on careful blunt dissection and undercutting a well defined lipoma was discovered and freed from its firm fibrous base adherent to the deep fascia over the spinous processes of the lumbar region (Fig. 2). Very few bleeding

FIG. 2—SKETCH OF THE SPECIMEN
(HALF OF ACTUAL SIZE)

points had to be ligated. The wound was closed with 4 interrupted sutures, and small drainage provided at the lower end.

Result—Barring a negligible quantity of serum exudation which was expressed out after 48 hours the wound healed uneventfully. The parents were advised to bring the child for a routine check up after one month.

INTERESTING FEATURES

Spinal swellings in this region are invariably a source of worry to the operating surgeon for fear of continuity with the spinal canal and the fatal escape of cerebrospinal fluid during surgical interference in this site.

In this case precautionary measures were taken to aspirate with a fine needle in various directions, before freeing the base.*

*—The case was exhibited at the fortnightly clinical meeting of the Deolali Branch of the Indian Medical Association.

JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION

CALCUTTA, MAY, 1953

THE PRESENT STATUS OF INTRAVENOUS IRON THERAPY

The use of intravenous iron in the treatment of iron-deficiency anæmias is becoming rapidly popular. Several proprietary preparations of both Indian and foreign manufacture have been put into market for use by general practitioners and specialists. Time is therefore ripe to make an assessment for the status of intravenous iron therapy.

The daily requirement of iron in the body is small. The average man with 5 gm. of iron in the body does not assimilate more than 1 mg. of iron per day (Finch *et al*[1]). The average mixed diet provides this requirement in absence of conditions of duress. The assimilation of iron is a slow process in which the intestinal iron is absorbed by a process of oxidation of apoferritin into ferritin. In the circulation the ferritin parts with the iron which is taken up by siderophillin —a β_1 globulin fraction (Cohn's fraction), which has the property of adsorbing iron and transporting it for the purposes of storage and metabolism. The rate at which ferritin gives up its iron depends principally on the oxygen tension of the blood, and therefore indirectly upon the hæmoglobin level. In anæmic states the iron utilisation is greater than when the hæmoglobin level is high. Nature, therefore regulates the rate of iron assimilation, within limits, according to the requirements of the body provided the processes of digestion and absorption are not interfered with. The necessity for the use of intravenous iron therefore arises only when the natural process of absorption of iron from the gut and its assimilation suffer. Usually gastro-intestinal disorders, diarrhœa and indigestion affect the former and chronic infection and liver disease the latter process. When there is a rapid drain of iron from the body with depletion of the iron-reserve and a quick hæmopoietic response is wanted intravenous iron may be used with advantage. One of the states in which the last condition pertains is severe anæmia in late pregnancy. Nevertheless, it is understood that in the treatment of iron deficiency anæmia the first line of defence is a search for the cause. The choice of treatment is oral iron therapy. The use of intravenous iron should be limited to those selected cases where oral iron is contraindicated or the hæmopoietic response unsatisfactory.

The choice of the brand of intravenous iron is important. Dyalised iron has been known to give rise to multiple pulmonary embolism (Polson[3]). Both Heath and co-workers[2] and Nissim[4] observed multiple emboli in the lung and elsewhere following the use of colloidal ferric hydroxide. These are now considered unsafe for use on human subjects although they hold a place of distinction by their earlier use in experimental studies on iron metabolism and intravenous iron therapy. Modern commercial preparations consist of a saccharated oxide of iron and are to a great extent free from these dangers, provided adequate care is exercised in their use. The solution is carefully adjusted to a suitable pH at which the iron remains in a colloidal state and does not precipitate the serum proteins. Slack and Wilkinson[5] devised a simple test by which the suitability of a particular preparation for intravenous use can be easily determined. Standardisation of the product so that 50 L.D. is 300 mgm. of iron should be strictly adhered to.

The manner of administration is also important. The injecting system consisting of the syringe and needle should preferably be washed in glass distilled water and dried with alcohol and ether. Admixture with electrolytes alters the delicate pH of the solution and tends to cause flocculation of the iron. Birch and Till[6] have described toxic reactions as a result of such flocculation. The solution can usually be given undiluted, but if dilution is considered necessary ionisable electrolyte solutions are best avoided. Isotonic glucose solution is preferable to normal saline.

The dose of intravenous iron should be carefully calculated for each patient. The desired increase of hæmoglobin percentage multiplied by 24·5 (in round figures, 25) gives the total iron requirement in milligrams for any individual case. Slack and Wilkinson[5] recommended an additional 50 per cent of this amount in order to build up the iron reserves of the body. Mukherjee[7] used an additional 400 mgm. to the basic figure in a state of pregnancy so as to meet the fœtal requirements.

Earlier investigators used single large infusions of iron (Nissim[4], Mooney[21], Ramsay[22]), but toxic reactions after such doses were common. Most recent workers on the subject have used small initial doses followed by gradually increasing amounts. Slack and Wilkinson[5] used 25 mgm. as the first dose. Govan and Scott[8, 9] recommend 30 mgm. Brown and co-workers[10] 20 to 50 mgm. and Beaumont and Dodds[11], 50 mgm. as the initial dose. It is, therefore, well to commence with an initial dose of 25 to 50 mgm. of intravenous iron depending upon the height and weight of the individual and the degree of anæmia present. Investigations on Indian subjects by Jhatakia[12] and Mukherjee[7]

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[4] *Lancet*, 2: 49, 1947.
[5] *Lancet*, 1: 11, 1949.
[6] *Brit. M. J.*, 1: 62, 1951.
[7] *Indian J. M. Sc.*, 5: 689, 1951.
[8] *Lancet*, 1: 14, 1949.
[9] *Lancet*, 1: 367, 1951.

show that this dose is fairly well tolerated. Subsequent injections may be given daily in gradually increasing doses. One to two hundred milligrams of iron may be given daily and are usually well tolerated. When satisfactory hæmatological response is noted injections may be spaced out on alternate days or twice in a week until the total requirement has been given. For the maintenance of treatment oral iron medication is the choice unless there is some gross contraindication for it.

The danger of exceeding the total requirement, and of injudicious use of intravenous iron, is a disorder resembling hæmochromatosis or transfusion hæmosiderosis. This has been recently discussed by Cameron *et al*[13]. Iron encepalopathy, another important danger of intravenous iron therapy, has been rare since the general use of saccharated iron.

Intravenous iron injections have been often known to give rise to local and constitutional reactions. Extravasation at the site of injection causes pain, inflammation and subsequent fibrosis. Occasionally the injection of iron into the vein is attended with marked venospasm. Attention to this has been drawn by Govan and Scott[9], who suggest that this may be a warning before constitutional reactions develop.

Systematic reactions are generally mild and consist of rigor, flushing of the face and occasionally epigastric and lumbar pain. In severe cases a sense of constriction in the chest, dyspnœa, fall of blood pressure, fainting, epileptiform convulsions (Librach[14]) and unconsciousness have been recorded. These reactions usually develop within a few minutes of the injection, less commonly even before the injection is over. In mild cases the symptoms last a few minutes only. Severe reactions have been known to be followed by lumbar and epigastric pain and precordial distress for as long as 24 hours (Nissim[4], Librach[14]). Very recently a case has been reported (Barrit and Swain[15]) where sudden death followed an intravenous injection of iron saccharate.

The cause of these reactions is not clearly understood. Beaumont and Dodds[11] suggest that anginal, chest and lumbar pains may be caused by impurities in the sucrose used in the manufacture of the saccharated iron. Some of the manufacturers may investigate this point with benefit. Prain[16] observed that severe reactions and death may be caused by acute liver failure. Necropsy confirmation of this observation is yet lacking. It is, however, well worth remembering that iron, in common with all heavy metals, is a protoplasmic poison. Iron on being introduced into the blood stream is carried by the iron-binding protein (Cohn's β_1 globulin fraction). The possibility of a saturation of this iron binding protein and/or a temporary concentration of iron saccharate in the blood has been suggested by Klopper[17] as a cause of the reaction. Spencer[18] believes that the iron after injection on being freed combines with the sulphydril radicles and interferes with tissue oxidation.

Govan and Scott[9] state that the toxic reactions depend on the amount given in a single injection. Librach[15] cites a case which suggests there may be a critical level at which toxic symptoms appear. Should such a critical level exist it must vary considerably in different persons. Toxic reactions have been observed at widely different levels of therapeutic dose. If interference with the iron binding capacity is responsible for the toxic manifestations of the drug, it is worth while to remember that chronic infection and severe liver disease decrease the iron-binding capacity of the plasma. The possibility of reticulo-endothelial block in the production of toxic reactions has not been sufficiently investigated.

The toxic effects of iron show some similarity with the nitritoid reactions sometimes met with after intravenous injections of arsenic or antimony compounds. There are reasons to believe that arsenical toxic reactions are of anaphylactoid nature (Harrison[19], Tate[20]). It is possible that the reactions following intravenous injections of iron may be allergic in character. Investigations in this line may prove interesting. Librach[15] has reported a case where moderately severe toxic reactions were observed repeatedly after intravenous injections of iron to an asthmatic subject.

Intravenous iron is a new therapeutic implement. It is highly useful in well selected cases. But its use is not unattended with danger. General practitioners should not undertake it lightly. To the specialists it has opened a new channel for investigation and research. Finally, intravenous iron does not replace oral iron treatment. Its use lies in where iron is indicated, but oral iron fails.

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[9] *J. A. M. A.*, 144: 1084, 1950.
[11] Recent Advances in Medicine, J. A. Churchill, London, 1952.
[13] *Indian J. M. Sc.*, 5: 110, 1951.
[15] *Canad. M. A. J.*, 64: 67, 1951.
[14] *Brit. M. J.*, 1: 21, 1953.
[15] *Brit. M. J.*, 1: 379, 1953.
[16] *Brit. M. J.*, 2: 1019, 1949.
[17] *Lancet*, 1: 531, 1951.
[18] *Brit. M. J.*, 2: 1112, 1951.
[19] In Price's Text Book of Medicine, 1942.
[20] In Modern Trends in Dermatology, Mackenna, London, 1948.
[21] *Brit. M. J.*, 1: 1267, 1950.
[22] *Brit. M. J.*, 1: 1109, 1950.

CURRENT MEDICAL LITERATURE

Intestinal Upset After Treatment with Chloramphenicol

Sandmann (*Deutsch. med. Wochschr.*, 77: 557, 1952, Ref.: *J.A.M.A.*, 149: 1319, 1952) writes that of 21 nursing infants between the ages of two and six months with pertussis treated effectively with chloramphenicol (chloromycetin), seven had intestinal upset within 14 days after the discontinuation of therapy. Reduction of the bacterial flora in the intestines caused by the drug may result in dyspeptic disturbances, with recurrent increase of the bacterial flora after discontinuation of therapy. To 37 nursing infants with pertussis treated with chloramphenicol, 1 tablet of living Lactobacillus acidophilus was given three to five times immediately after administration of chloramphenicol was discontinued, and in addition up to 7 per cent beta lactose was added to the formula. The administration of living lactic acid bacteria and lactose is recommended for prevention of intestinal disturbances after administration of chloramphenicol.

Fatal Ventricular Fibrillation after Procaine Amide Therapy

Read (*J.A.M.A.*, 149: 1390, 1952) reports a case of ventricular fibrillation with death immediately following an intravenous injection of procaine amide. It is emphasized that caution is necessary in the use of this drug; increased caution is suggested in cases of bundle branch block.

Ventricular Acceleration After Procaine Amide

Denney and others (*J.A.M.A.*, 149: 1391, 1952) report a case of ventricular tachycardia treated with procaine amide ("pronestyl") hydrochloride in which the following events occurred: (*a*) progressive and pronounced widening and notching of the QRS wave of the electrocardiogram, (*b*) a short paroxysm of ventricular acceleration of a prefibrillation type, and (*c*) restoration of sinus rhythm. It is suggested that, as with quinidine sulphate therapy, a widening of the QRS wave during the administration of procaine amide hydrochloride may represent a precursor to ventricular fibrillation and is an indication for discontinuance of the use of the drug.

Allergy to Procaine Amide

Hellmann (*J.A.M.A.*, 149: 1393, 1952) writes that hitherto, reported toxic effects of procaine amide had been limited to the circulatory and gastrointestinal systems. Recently, reference has been made to three cases of agranulocytosis and two cases of urticaria following its use. Although it is not unusual to find a patient who is sensitive to quinidine and who has fever and a skin eruption following even small doses, such a reaction to procaine amide has not been previously reported.

Fever Due to Procaine Amide Therapy

Bakos and Askey (*J.A.M.A.*, 149: 1393, 1952) report an instance of fever, chills, rash and malaise following oral administration of procaine amide ("pronestyl") hydrochloride.

Rhinoscleroma Treated with Streptomycin

Russel and others (*J.A.M.A.*, 148: 642, 1952) report a patient with rhinoscleroma treated with streptomycin (½ gm. of streptomycin every 4 hours) showing clinical improvement within five days after the beginning of therapy and cultures (from nares and the soft palate) promptly becoming negative for Klebsiella rhinoscleromatis. The authors further report that lesions did not recur during a subsequent three year period of observations. This dramatic response to streptomycin therapy in this patient lends additional weight to other exciting evidence that Klebsiella rhinoscleromatis is the causation agent in the disease from which it is named.

Chloramphenicol in Granulomatous Ulcer of the Nose

Sneddon and Colquhoun (*Brit. M. J.*, 1: 298, 1952) present a case of progressive granulomatous ulceration of the nose and face.

A penicillin-resistant *staph. pyogenes* was isolated from the lesion, at first in combination with a hæmolytic streptococcus and an avirulent corynebacterium; later the staphylococcus was obtained in pure culture.

Aureomycin prevented an extension of the infection, but a staphylococcus sensitive to the drug *in vitro* could still be recovered from the lesion.

Chloramphenicol produced a gradual but complete recovery, with coincident disappearance of the staphylococcus from the ulcer.

The ætiology of the condition is discussed and the suggestion put forward that it is a non-specific but unusual response to staphylococcal infection.

It is suggested that chloramphenicol may be as good as, if not superior to, aureomycin in the treatment of staphylococcal infections.

Megaloblastic Anæmia of Pregnancy

Israels and Da Cunha (*Lancet*, 2: 214, 1952) in reporting on six cases of megaloblastic anæmia of pregnancy treated successfully with folic acid observed amongst other things that 5 patients showed sore tongue with or without buccal ulcers, 5 had dyspnœa on exertion, 1 complained of dysphagia, 2 of vomiting in late pregnancy, 2 had short bouts of diarrhœa and none showed any abnormality in the central nervous system. The authors maintained that the possibility that megaloblastic anæmia was present should always be considered when an anæmic pregnant patient did not respond as expected to iron and they stressed on the paramount importance of bone marrow biopsy for correct diagnosis.

All the patients were treated with folic acid. This is usually given orally in a dose of 20 mgm. daily; but, if time is short, it can be given intramuscularly (30 mgm. daily for three days) or intravenously (100 mgm. diluted in 250 ml. of saline solution given through the usual drip apparatus). Maintenance with a daily oral dose of 20 mgm. of folic acid should be continued into the puerperium until the blood count has been normal for a month; folic acid can then be withheld, but the blood count should be checked again later.

Some of the patients treated with folic acid who have not had previous iron treatment later develop an iron-deficiency type of anæmia that will need oral iron as well as folic acid. If the woman is first seen very late in the pregnancy, or has severe blood loss at labour, blood transfusion may be needed to tide over the immediate emergency; but, of course, treatment with folic acid and iron, if needed, should be begun as soon as possible.

Aureomycin in Trichomonas Vaginalis

Greenblatt and Barfield (*Am. J. Obst. and Gynec.*, 62: 423, 1951) write that vaginal insufflation of aureomycin powder (containing talc and powdered milk sugar) offers a

satisfactory method of treatment of recalcitrant cases of vaginitis due to Trichomonas vaginalis. The method recommended is vaginal insufflation (with care to avoid sustained pressure) of a powder containing aureomycin 0·25 to 0·5 gm., talc 1·0 to 2·0 gm. and lactose 1·0 to 2·0 gm. once daily (or every other day) for five consecutive treatments, then as prophylaxis, once weekly for five weeks. These conclusions are based upon the results obtained in 53 cases of acute vaginitis due to Trichomonas vaginalis. At the end of the first week's treatment the organisms were absent in 47 of 48 cases examined (i.e., 97·8 per cent). Immediate relief of pruritus and cessation of leucorrhœa were reported by 37 of these 48 patients (i.e., 77·1 per cent). A month after the cessation of treatment, 37 patients were re-examined: trichomonas were found in eight, and no evidence of recurrence in 29 (78·3 per cent).

Isonicotinic Acid Hydrazine in Tuberculous Meningitis in Children

Sweetnam and Murphy (*Lancet*, **2**: 160, 1952) write that four children with tuberculous meningitis were treated with isonicotinic acid hydrazide either alone or combined with streptomycin, for a period of 8-10 weeks.

A child who had I.N.H. alone showed dramatic improvement, and became clinically well within a week. Her C.S.F. became normal in 8 weeks, and remained so for at least 2 weeks after stopping treatment.

The three other cases were treated initially with streptomycin and later with I.N.H., or with the two together. The results were equivocal.

There were no signs of drug toxicity, other than a temporary fall in hæmoglobin level, but signs of intolerance appeared when the dosage was increased to 16 mgm. per kg. body-weight.

Antibiotics in the Treatment of Pancreatic Fibrosis

Shwachman and others (*J.A.M.A.*, **149**: 1101, 1951) give in the following lines the summary of their observations on the treatment of pancreatic fibrosis with antibiotics:

An evaluation of terramycin in the management of 49 patients with pancreatic fibrosis is presented. Thirteen patients (group A) received no previous antibiotic therapy. The remaining 36 (groups B and C) had received aureomycin and other antibiotic and chemotherapeutic agents for varying lengths of time.

2. Each of the 13 patients in group A had an excellent response as judged by the improvement in pulmonary symptoms, well-being, and nutritional status. Of the other 36 patients in groups B and C, all but 5 responded favourably. No serious untoward reaction to terramycin was encountered. Clinical relapse usually occurred when the antibiotic was discontinued.

3. The effectiveness of terramycin is compared with that of aureomycin in the management of pancreatic fibrosis in 36 patients. It is concluded that the two drugs are equally efficacious. In seven patients aureomycin seemed to be more effective than terramycin, and in seven patients terramycin seemed more effective than aureomycin. In the remaining 22 patients both drugs were alike in their effect.

4. Terramycin is effective in the management of pancreatic fibrosis when administered in small doses of from 7 to 30 mgm. per kilogram of body weight on a daily basis. Early diagnosis and prolonged therapy result in the most favourable clinical response. Suggestions for the management of refractory cases are made by the use of combinations of antibiotics and the rotation of these agents.

5. The importance of other measures that have been mentioned in the management of patients with this disease should not be neglected. Indiscriminate use of antibiotics without proper control and frequent observations should be discouraged. The employment of adjunct measures, such as dietary control, good nursing care, personal hygiene, and the use of expectorants, should be part of the provision of complete medical care for each patient.

Kerosene Intoxication

Olstad and Lord (*Am. J. Dis. Child.*, **83**: 446, 1952) report kerosene intoxication in 71 infants and children. The amount of oil ingested was not always known, but the recorded amounts varied from 5 to 240 c.c. Respiratory symptoms were found in all patients, gastrointestinal symptoms in 35, central nervous symptoms in 28, leucocytosis in 39, elevation of temperature in 53, and pneumonia in 29. Proteinuria and/or glycosuria was present in 37 of the 57 patients whose urine was examined. Rœntgenograms were taken of 44 patients, 26 of whom had positive evidence of pneumonia in the lower lobes. In 19 patients with positive rœntgenographic findings no positive auscultatory findings were recorded. In general although the period of hospitalization was affected considerably by the presence of pneumonia and fever, it was proportional to the time that had elapsed from ingestion of kerosene to admission. The use of a stomach tube and copious lavage are recommended. The incidence of pneumonia was lower among the children who had vomited and had also received lavage. None of these patients died, but in 325 previously-reported cases the mortality rate was 5·85 per cent. Since most of these cases were due to accidental ingestion of kerosene in homes with kerosene stoves, a good preventive measure is instruction of families with this type of stove concerning its potential dangers.

Pertussis

Ladoccetta and Dawson (*Am. J. Dis. Child.*, **84**: 184, 1952) write:

Eighty-five patients with pertussis were treated with 50 mgm. of aureomycin per kilogram of body weight daily for 10 days, and 74 parallel controls received chemotherapy, penicillin, streptomycin, or sulfadiazine.

The difference in the course of pertussis between the aureomycin-treated patients and the control group under one year of age is slight and not statistically significant.

There was no apparent marked advantage in the course of pertussis from treatment with aureomycin over the treatment used in the control group when treatment was started after the first week of disease.

There appears to be no evidence to show that aureomycin gives significantly better results in the treatment of pertussis than does supportive treatment including no antibiotics, penicillin, streptomycin, or sulfadiazine. Aureomycin is a valuable adjunct to the medicaments for the treatment of pertussis but does not appear to exert a curative effect on the disease. Along with other measures, including use of oxygen, sedation, nasopharyngeal aspirations, and proper nursing care, aureomycin may be of value in the management of the disease. The value of good nursing care cannot be overemphasized for the successful treatment of pertussis.

CURRENT TOPICS

SOCIAL AND SOCIALIZED MEDICINE WITH SPECIAL REFERENCE TO AUSTRALIA

DR. L. R. MALLEN of Australia during his recent visit to India spoke on Social and Socialized Medicine with special reference to Australia. The text of his speech at Delhi is as follows:

I thank you very much for giving me this privilege of speaking to you, and telling you something about conditions in my own country, and about the World's Medical Association.

May I make it quite clear to you all, however, that I am not here to tell you, or even to advise you on how to conduct your own affairs. How you should meet the menace —for it is a menace—of socialized medicine, I leave entirely to you—the doctors of India.

There are, unfortunately, far too many so called experts —especially when dealing with social and/or socialized medicine—who are always only too willing to expound their own particular views and to give advice. This advice is founded only on theory, and not on fact, for they usually have had little or no experience in the practice of medicine. These views are, for some unknown reason, accepted by governments or like bodies, in preference to advice given by their own people.

It should be an obvious fact, a very obvious fact, that the members of the medical profession, the doctors who live and work among the people, are best qualified to fully advise their own governments on health matters or service. If the doctors are wise, they will take heed of what has been done in other countries, and will learn from the mistakes made, or the successes gained. They can then, knowing the particular and/or peculiar problems affecting their own people, pool all this knowledge, and so be in a position to give the soundest of advice to their own governments. We, the Council of the World's Medical Association (and remember that the World's Medical Association represents over 700,000 doctors in 44 countries) are doing our best to make the various governments see this point of view. We try to get them to consult the profession in their own country and, if calling in expert advisers, to at least find out that the person consulted does know something about, and has had some practical experience of what he is being asked to advise upon.

Therefore, knowing very little about conditions in your country, I am simply going to tell what we have done, and what we are doing in my own country—Australia—in social and socialized medicine. You can then judge for yourselves how this fits in with the concept of Social Security as recommended by the World's Medical Association.

A small brochure has been published by the World's Medical Association called "Statement on Medical Aspects of Social Security."* If you have not read it, I commend it to you. After you have read it, pass it on to members of your government.

You may ask, "Why social and socialized medicine?" I am not going to be rash enough to define social medicine, but to say that social medicine can very easily be turned into socialized medicine. In practice, we all know the difference between social and socialized medicine. The profession all over the world has always accepted social medicine, and in almost every country, have strenuously opposed socialized medicine.

In every country, social medical services are in operation—our service to the indigent and the pensioned, our various health services such as infectious disease regulations, quarantine acts etc. These services have always quite rightly been considered a part of the normal activities of the profession. We are always endeavouring to improve on them—to raise their standard, and so improve the health of the community. I am sure that none will quibble with this view, but beware that they are not so altered or increased in scope, that socialization follows. By socialized medicine, we mean the conscription of the profession (and of course, all its ancillary services) in the employ of the government or some similar body. This conscription may be compulsory, or by its method of application become compulsory for all to join, if one is to make a living.

All over the world, people are looking for security, and especially for social security. One of the most important parts of any social security scheme is that dealing with health. Good health and the maintenance of good health is still our most precious asset, and so social security becomes of great importance to us, as doctors, and because of all this, the World's Medical Association has, and is taking a very great interest in all plans for social security. We have always recognized that the health and welfare of the individual patient comes first, and have stressed that there is a balance of mental and physical factors in the health and well being of an individual. Any scheme which disturbs this balance is to the disadvantage of the individual. Therefore, the World's Medical Association has recommended that:

1. When social security schemes are necessary, they should be developed in the closest collaboration with the medical profession. Such schemes should take into account the psychological dependency and diminished responsibility, therefore

2. The fundamental aim of a Social Security Scheme should be to raise the individual to a level at which he can help himself. From this it follows that

3. Any Social Security Scheme should contain elements that encourage self reliance and a sense of personal responsibility, and that

4. Any Social Security Scheme should stress the obligation of the individual to make at least part of his contribution directly to the functioning and costs of the scheme.

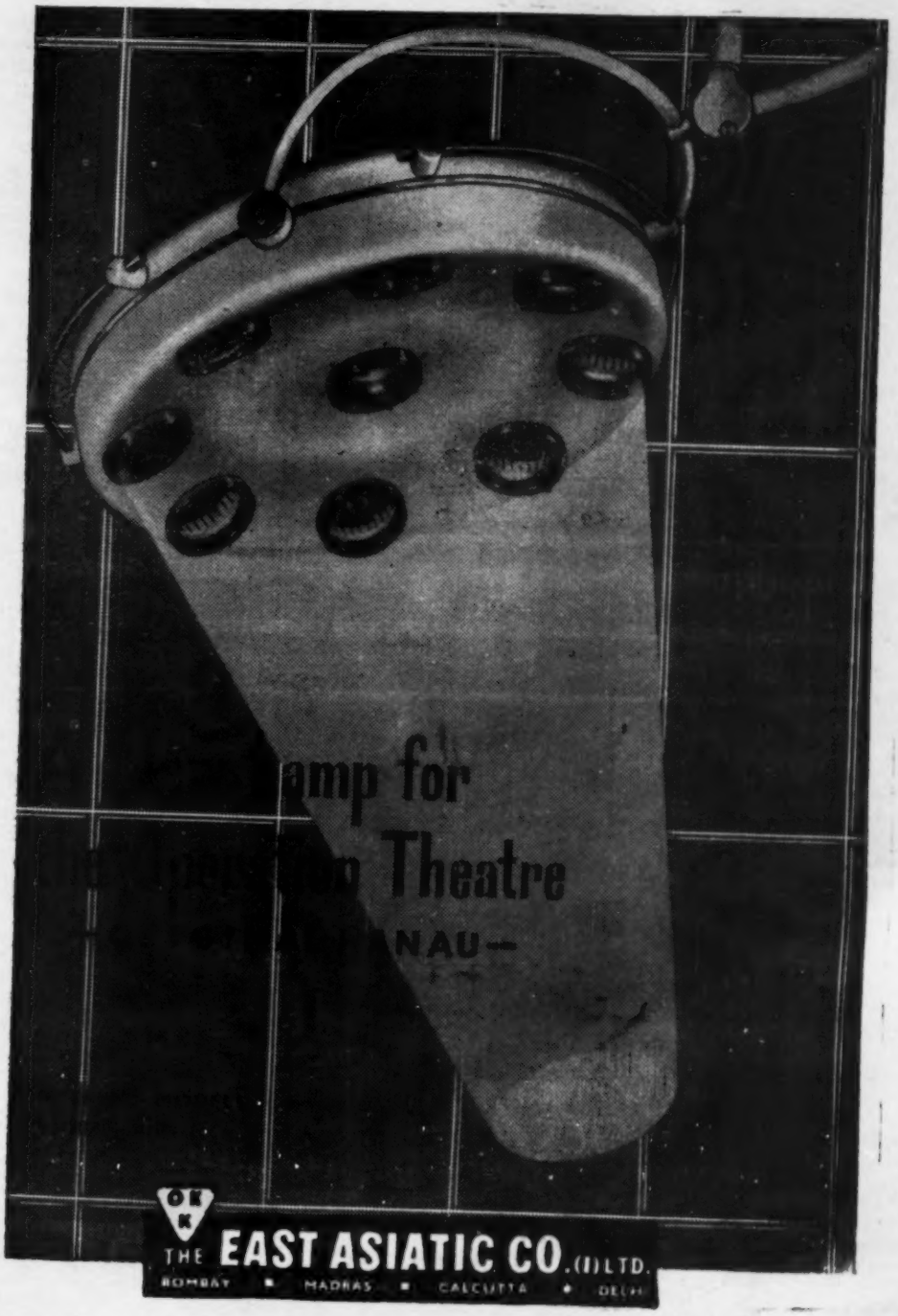
How do we match up to this in Australia? I will tell you what steps we took to prevent the Nationalization or Socialization of our Health Services, and what we are doing now.

The fight, for it was a fight, really commenced before World War II, when the Nationalist Government then in power (led by Mr. Menzies) endeavoured to bring in a Health Insurance Act, closely following the panel system then functioning in England. This, the profession vigorously opposed on two main grounds:

(1) the capitation system of payment, and
(2) the actual amount of capitation offered.

A Royal Commission was appointed to take evidence and make a report. Unfortunately, before it had finished its work, an air disaster took place, in which most of the leading counsel taking part in the commission, together with several other prominent people were killed. Before any further move could take place, war broke out.

* *vide* J. Indian M. A., 22: 80, Nov. 1952.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Shortly after war commenced, a change of Government took place and a Labour Government led by the late Mr. Curtain came into power. They stated that it was their intention to make available to the people (at no cost to the patient) a full medical and health service, including all the ancillary services. In other words, they were going to nationalize or socialise medicine.

We were then in the middle of the war, and a goodly proportion of the doctors were in the armed forces. The Federal Council of the B. M. A. in Australia said that it was not prepared to alter the *status quo* of the profession until these men had returned to civil practice, and thus could have a say in any negotiations.

However, in 1944, the Government decided to push ahead with their health schemes, and a Bill, the Pharmaceutical Benefits' Bill was passed, making medicines free to the people. The basic provision of this Bill was that for the medicines to be free, they had to be prescribed from a prepared Government Formulary, and be written on a Government form.

This brought forth very strong opposition from the profession, and the then President of the Federal Council (Sir Henry Newland) wrote the following to the Minister of Health:

"I have been requested to convey to you, with all respect, the opinion of the Federal Council, that rigid adhesion to a formulary, and all the more if enforced by contract violates the first great principle of medical practice, namely that, whatever the organization, the doctors taking part, must remain free to direct their clinical knowledge and personal skill for the benefit of their patients in the way in which they feel to be best. The Federal Council holds that the medical profession, in the interest of the public's health, must retain the priceless asset of individual freedom, and enterprise. On this principle, the Federal Council can make no compromise."

Through all our negotiations, we have adhered to this principle. We refused to use the formulary and opposed the Government in every move they took to make us use it. There were other objectionable clauses in the Act, especially those dealing with penalties to which the profession took great exception, and we were fortunate in having the backing of the majority of the doctors. A stalemate was reached until the Medical Society of Victoria obtained from the High Court of Australia, a declaration that the Act was invalid.

This was a big set-back to the Government, and so in 1946 they asked the people, through a referendum, for extension of powers. They asked that Parliament might make laws with respect to "the provision of maternity allowances, widows' pensions, child endowment, unemployment, pharmaceutical, sickness and hospital benefits, medical and dental services (but not so as to authorize any form of civil conscription), benefits to students and family allowances."

You will note how all forms of service were included in this proviso, and everybody naturally voted for it, for who would deny widows' pensions, maternity allowances etc. long established in Australia.

The Government were returned with a big majority, and the referendum carried. Long negotiations took place between the Minister of Health, and the Federal Council. These negotiations were nearly always asked for by us, and took the usual form, the profession raising objection to what the Government wanted. We were never consulted in any plan, or on any Act to be passed. It was put before us, and we then opposed the objectionable or unnecessary clauses.

We submitted an alternative to using the all embracing government formulary, a plan later to be adopted by our present Government. This was the provision of a limited list or formulary, containing only those drugs which were life saving, or disease preventing, many very costly.

The Government then decided to drop the penalty clauses in the old Pharmaceutical Benefits' Bill, and instead, conferred on the Minister of Health, the power to determine offences, and make penalties. The Minister also approached the Federal Council with the proposal for a complete medical service, free to all, and to be paid for out of Social Services Taxation. There was to be direct contract between the doctors co-operating, and the Government, and the method of payment might be either free for service, capitation fee, or salary, or some combination of these three methods.

In reply, the Federal Council presented to the Minister, a constructive policy on the National Medical Services. The essentials of this policy were that the role of the Government was to supply capital expenditure, that any medical service was to be controlled by a non-Governmental body in which the doctors would form a majority. There should be a free choice of doctors by the patient and *vice versa*, that payment be by fee for service, and the preservation of the contract between doctor and patient be kept intact. There should be no contract between Government and doctor.

This was discussed at a meeting between the Government and the Federal Council in July, 1947. At this meeting the Minister of Health was repeatedly asked if the ultimate object of the Government's policy was the elimination of private practice. To this he replied "That is so, There is no dispute as to that."

This still further closed the ranks of the profession. We felt certain also, that the majority of the people would support us in opposition to the Government scheme.

In May, 1948, to force us to use the formulary, and be dragged into the first part of the Government Scheme, regulations were passed under the New Pharmaceutical Benefits' Act as follows.

The Formulary was to be delivered, together with rules and books of prescription forms, by registered post to every practitioner in the country. We could be called upon to deliver up these documents at any time, and failure to do so, meant a fine of up to £50. We took delivery, but still did not use them.

This refusal to co-operate led to a postponement of the National Health Service Bill until 1948. In the debate in Parliament on this Bill, the then Prime Minister (the late Mr. Chifley) said that "All the doctor will be asked to do, is to furnish a return, showing the people he has attended and what they were attended for?" This meant the end of professional secrecy. This completely consolidated the profession and put even more of the people on our side.

As an election was due in late 1949, we continued our resistance, and then came the first real attempt at conscription. This we had hoped the Government would do. A regulation was passed that no drug which was in the Government Formulary could be prescribed by a doctor except as set out in the Formulary and on a Government Form.

A fund was started called the "Federal Independence Fund" which was subscribed to by practically every doctor in Australia, and by quite a number of lay people.

We, for the first time, openly entered the political field. The money raised was used to pay for a vigorous and sustained publicity campaign, using the press and the radio and for the printing of pamphlets and to pay any legal costs.

We applied to the High Court of Australia, and here you must recall the safeguarding words inserted in the referendum of 1946. "But not so as to authorize any form of Civil Conscription."

In October, 1949, the High Court gave the decision our way, declaring the regulations invalid. All the Government could hope for was that they would be returned at the election in November, and so have a mandate to proceed with their plan for the Socialization of Medicine in Australia.

They lost the elections by a big majority, and there is no doubt that the attitude of the profession had a considerable influence on the result of the elections.

And so to the present. The Minister of Health (Sir Earle Page) has formulated a plan for a Health Service, and wherever possible seeks the advice of the profession in Australia. He has publicly stated that the new health scheme would establish a partnership between individual and the State. He was going to initiate a programme of medical benefits and provide the necessary machinery free of red tape, of departmentalism and of restrictions on professional standards. The Government has chosen the method of a working partnership with the profession.

The aim of the Government, he said, was to improve the quality of medical services in its essential factors by stimulating individual and community effort. He stressed the fact that in those communities where everything was free, the cost of the service became exorbitant and the standard of work especially among the general practitioners deteriorated because of the time given to unnecessary consultations, the filling in of forms etc.

Experience has shown that the most likely system to satisfy all requirements is one of voluntary insurance.

This is the scheme now sponsored by the Government to encourage the individual to insure and so to become a little independent—to help themselves.

It is impossible to bring in any scheme for a full health service too quickly and all at one time, and so the Government is proceeding step by step.

Sir Earle Page seeks the advice of the Federal Council of the B. M. A. whenever possible, and with each step that is brought in.

The first step was the provision of an increased pension to all suffering from tuberculosis. The amount now payable is practically equal to the basic wage and the sufferer is now spared the worry of finances. There is no need for him or her to return to work too soon, as was the case when financial stress generally proved too great. At the same time an intensive campaign against tuberculosis is being waged, and the Commonwealth finances the States in order that suitable hospitals and homes may be built, and that a full x-ray survey of all individuals between 15-65 years can be carried out.

The second step was the provision of free life saving or disease preventing drugs. A list of these drugs has been drawn up by an expert committee, nominated by the Federal Council of the B. M. A. This list is constantly revised as newer and better drugs are discovered.

In order to curtail excessive prescribing, especially of the antibiotics such as aureomycin etc., a regulation was passed stating that these drugs can only be prescribed under the Pharmaceutical Benefits when used for specific diseases. We do not like this regulation and have told the Minister so, but we are prepared to work under it until such time as the profession and the public are educated to the proper use of these drugs. At the same time publicity in the Medical Journals and over the Radio has been made to acquaint the profession and the public concerning the dangers of unnecessary and wrong using of the antibiotics.

The third step was the provision of a half pint of milk to every child under the age of 12 years, attending any school recognized kindergarten, nursery school or creche.

The fourth step was the Pensioner Medical Service. This provides free general practioner medical treatment and free medicines to all old aged, invalid and widowed pensioners and their dependants. A list of the names of all doctors prepared to work in this scheme is furnished to the Department of Health by the various State Branches of the B. M. A. The Government pays a fee for service -9/- per surgery consultation, 11/- per visit and 4/- per mile for each mile over three miles a doctor has to travel. Each doctor is provided with a book of vouchers, these vouchers are filled in, giving the pensioner's name, his number, date of service, and is signed by the pensioner or some responsible person. At the end of each month, these vouchers are to sent to the Department of Health, and payment is made direct to the doctor. Any drug in the British Pharmacopoeia may be prescribed on a duplicate prescription form, giving patient's name, number and date, and payment is then made direct to the chemist. At present there are about 600,000 pensioners and dependants in the scheme. A means test is always applied to anyone seeking a pension, and only those in very straightened circumstances can receive a pension. If the means test is lifted, the profession will then demand a review of rates paid per service.

The fifth step was the provision of a subsidy to all persons insured in a voluntary hospital fund in order to meet the rising cost of hospitalization. For some time, the Government have been paying 8/- per day to any patient who was an inpatient of an approved hospital.

If a person insures himself or herself with an approved voluntary hospital insurance society, paying a minimum of 6/- per day towards cost of hospitalization, the Government have agreed to subsidize this benefit by 4/- so that a patient can now receive 8/- plus 4/- (12/-) from the Government, together with at least 6/- from the society, a total of at least 18/- per day off their hospital expenses. A society to be approved must be a mutual society, and the expense/income ratio must be approved as reasonable. The usual premiums paid are 6d. 1/- or 2/- per week, and the benefits £2-2-0, £4-4-0 and £8-8-0 per week The average cost of hospitalization is about £20 per week.

These measures are all in actual practice at present. The cost of the Pensioner Medical for the past twelve months was £1,036,225 for medical services and £357,632 for medicines.

The cost of the Pharmaceutical benefits was £7,327,414, or approximately 17/6 per head of the population.

The next or sixth step is the provision of a subsidy for medical fees. This is not at present in operation, and nego-

tiations are still proceeding between the insurance societies, the profession and the Government.

It is the intention of the Government to subsidize the benefits towards paying the cost of medical treatment, so that up to 90 per cent of the total cost may be met. The patient will always be responsible for at least 10 per cent of the doctor"s fees. The Insurance Society must be an approved one, in the same way as for hospital benefits. The actual rates and of course, the benefits provided vary with the different societies. Two types of service are to be provided

(*a*) A general practitioner service including obstetrics and minor surgery. In other words, the type of service usually provided by a general practitioner.

(*b*) A full medical service which will include all surgery, pathology, radiology or any speciality.

In any service the benefit paid by the Government must be at least matched by the insurance society, and in no case must the combined benefits exceed 90 per cent of the doctor's fee for that particular service.

Most insurance societies, to protect themselves, have an upper age limit for joining, usually 65 years. and do not pay any benefits for a pre-existing disease. They also demand that a patient be a member for a period of time, usually three months, before a claim can be made.

The Government, however, has asked for the age limit to be abolished. They will also pay benefit for the treatment of any disease pre-existing or otherwise, and will do so from the actual date of joining the society.

At present, the consulting fee usually charged by a general practitioner is 15/-. It will probably work out that an insurance society will pay as its benefit 6/- and the Government 6/-, making a total of 12/- out of the fee of 15/-.

The maximum benefit that the Government will pay towards any one service is £ 11-12-6 for certain major operations. A list was prepared by the Government, giving the benefits it was prepared to pay towards each service, the actual amount varying from 5/- to £ 11-12-6. The list, however, was too cumbersome for easy working. nd we are endeavouring to simplify it.

The patient, to obtain the benefits, must produce a receipted account—this account will show the date of first consultation or visit, the number of consultations or visits made, and whether for sickness, accident, midwifery or operations. If for an operation, or special service, the operative or diagnostic procedure to be named.

Under this scheme, the doctor will deal only with the patient, there will be no interferences with the doctor-patient relationship. The patient will do all the dealings with the insurance societies. The societies will pay both their and the Government benefits, and will be reimbursed for the latter from the Government.

A new Act will be brought into Parliament in the very near future which will cover all the steps that are at present in operation or intended to be put into operation. It will replace the present Act which works mainly by regulations. We have told the Government that we will not work under an act which governs principally by regulations. We are doing so now, only because of the promise made by Sir Earle Page that the old Act will be replaced by a new Act as soon as it is possible to do so.

The whole scheme makes a very interesting experiment It encourages the individual to help himself. It provides for the person who is unable to find finance to pay for treatment. It gives us a fee for service, and does not interfere with the doctor-patient relationship.

There will always be abuses, both by the patient, and by the doctor. The Government have asked the profession to form disciplinary or advisory committees in each State to advise them on any irregularities. This we have done, and these committees are properly constituted by Act of Parliament. The Committees have the power to take evidence on oath, to summon witnesses etc. to appear before them, and to make recommendations to the Minister, as to what punishment, if any, shall be given. The defendant has the right to appeal to a Court ruled over by a Judge, if he thinks the findings of the Committee wrong or the punishment too severe.

I thank the World's Medical Association who have made my visit to your country possible, and I trust that what I have said may be of some use to you in your future negotiations with your own Governments.

THE EMPLOYEES' STATE INSURANCE SCHEME AND THE MEDICAL PROFESSION

Dr. S. C. Sen, Hony. General Secretary, Indian Medical Association, has issued the following statement:

It is noticed that a section of the press and some officers of the Employees' State Insurance Corporation and some State Governments are blaming the medical profession for its lack of co-operation and excessive demands for remuneration for the delay in the implementation of the scheme in Bombay and Punjab, where the scheme was to start by the beginning of this year.

As there is no basis for such an allegation, it is forced on me to place before the public the true facts. The Indian Medical Association fully co-operated in evolving the scheme, contributed carefully considered suggestions for perfecting the Scheme and emphatically laid down certain principles on which the Scheme should be based, if it was to be beneficial to the workers and financially successful. It also very emphatically suggested that to give medical benefit, it is only the panel system which will be feasible, efficient and economical rather than the service system. (Experience of Kanpur and Delhi support our views).

The Indian Medical Association was of the opinion that the Doctors should be asked to give only the medical service, the arrangements for the supply of drugs, dressings and injection materials being the responsibility of the Corporation. In spite of this opinion, with a view to enable the Corporation and the State Governments to start the Scheme at an early date, the Indian Medical Association advised the Medical Profession to supply drugs, dressings etc. from their own dispensaries, and to accept one capitation fee both for medical service and supply of ordinary medicines, except costly drugs.

A controvercy has arisen about the amount of capitation fee and the authorities in Punjab and Bombay are blaming the Medical Profession for demanding unreasonable and exorbitant terms and the former even threatening it. Out of Rs. 70/- per worker that the Corporation will get, Rs. 8/- per head is earmarked for general administration, whereas

only Rs. 3/- per head is being offered to the doctor for his services *for the year*, without any definite knowledge as to what may be required and without any restrictions. According to Director-General, Employees' State Insurance Corporation, incidence of illness and medical advice is 2 per cent. at Kanpur and Delhi, whereas the Bombay Government places it at 3 to 4 per cent. The Medical Profession in Bombay thinks it will be 5 to 10 per cent and in some places even more.

For drugs etc. Re. 1/- per head has been provided for ordinary drugs, Re. 1/- for costly drugs and Re. 1/- per head for overhead charges, including conveyance for domiciliary visits.

On the basis that a doctor in Punjab will have 2,000 patients on his list, the following calculation has been made by the authorities concerned:

Towards salary @ Rs. 3/- per annum ...	Rs.	6,000/-
Rent @ Rs. 50/- per month ...	,,	600/-
Telephone @ Rs. 20/- per month ...	,,	240/-
Conveyance @ Rs. 40/- per month ...	,,	480/-
Clerk or dispenser @ Rs. 50/- per month	,,	600/-
Misc. establishment @ Rs. 10/- per month	,,	120/-
Dressing and emergency equipment @ Rs. 10/- per month	,,	120/-
Cost of Medicine @ Re. 1/- per worker per annum	,,	2,000/-
TOTAL	Rs.	10,160/-

It is shown that on this basis, a doctor with 2,000 patients will be very well off, getting 500 Rupees a month from the Corporation, with a right of private practice and additional income from that source. It has, however, not been appreciated that every doctor will not have the maximum number on his list; perhaps the average will be 1,000 or even less.

Now if we analyse the situation, we get the following facts:

In U. K. for 2,000 patients on his list, a doctor has to see at least 16 patients in his dispensary and visit 8 patients in homes every day, i.e. on an average of 360 days in the year, he has to see 5,760 patients and make 2,880 visits to homes. According to other figures in U. K., 2,000 patients need 10,000 services from his doctor during the year. Roughly the incidence of sickness is about 1·5 per cent.

Assuming that the incidence of sickness in India will not be higher than in U. K., a doctor in India who will be lucky to have 2,000 patients on his list, will have to treat 5,760 patients in his surgery and visit 2,888 in their homes. For this work, he will get a maximum remuneration of Rs. 500/- a month, i.e. about ten annas per service including visits. He will be paid Rs. 2,000/- for the cost of drugs to be supplied on 8,640 prescriptions, i.e. less than -/4/- annas per prescription, he will be paid Rs. 480/- as a conveyance allowance for making 2,880 visits, i.e. only -/2/6 annas per visit. I wonder if the doctor will be able to use any conveyance for his visits and if he will be able to supply really good medicines with this amount.

As, however, there is generalised malnutrition, starvation and poor environmental hygiene in India as compared to U. K., the incidence of disease is likely to be much greater than in U. K. If the incidence is twice as great as in U. K. his conveyance allowance will work out at less than 1¼ annas per visit. the cost of drugs per prescription will work out at less than -/2/- annas and his remuneration for services will work out at about five annas per service including visits.

In fact it is presumed that the incidence of disease will be more than double of U. K. and because of lack of hospital beds, he will have many more patients on his hands than his colleague in U. K. who can transfer his serious and bad cases to hospitals.

It will thus be seen that the rosy view pictured that every doctor will have Rs. 500/- a month for very little work, is not the real picture. According to our calculations on the basis that every doctor willing to serve on the panel and fulfilling the necessary conditions, will be allowed to do so, very few, if any, doctors will have more than 1,000 insured persons on his list. We have arrived at the following tentative figures on the basis of a sickness incidence of 3 per cent, as accepted by the Bombay Government:

30 patients a day in Doctor's surgery	*Per Year*
Consultations, examinations, dressings injections, etc. @ -/6/- each ...	Rs.
i.e. Rs. 11/4/- per day,	
i.e. $\frac{45}{4}$ × 30 × 12	4,050/-
2 Home Visits a day— Rs. 2/- for the doctor and Rs. 2/- for conveyance ...	1,440/-
Cost of ordinary drugs per prescription -/2/- i.e. 32 prescriptions a day, i.e. 4 × 30 × 12	1,440/-
Overhead expenses—part rent	420/-
Part Salary of compounder, dresser, clerk ...	900/-
Telephone and other miscellaneous expenses ...	250/-
TOTAL	8,500/-

i.e. it works out at Rs. 8/8/- per capita

These figures may be higher for places like Calcutta and Bombay where rents and salaries are higher.

In spite of this calculation, the Indian Medical Association has decided that a capitation fee of Rs. 7/8/- (exclusive of costly drugs) may be an acceptable figure to start with, except in places like Bombay or Calcutta, on the definite understanding that proper statistics will be kept and that the situation will be reviewed at the end of a year and the end of the 3rd year and if necessary, higher rate of payment made with retrospective effect.

Doctors who will accept to work on the panel system will really be signing a blank agreement, not knowing how much hard work they will have to do, morning, noon, and night, day in and day out, throughout the year, without any holidays.

Doctors realize that it is their duty to render service to their people to the best of their *ability* and it has also to be realized by the authorities concerned that they should not try to exploit or blame, or threaten the medical profession, that there should be co-operation and understanding in their dealings with the Medical Profession.

NOTES AND NEWS

MEDICAL SCIENTISTS FOR INDONESIA

Thirteen top-ranking medical scientists from seven different countries have been scheduled to spend April and May in Djakarta, Jogjakarta and Surabaya to exchange information with their colleagues in Indonesia's medical colleges, hospitals and medical institutions. The visit has been organised by the World Health Organization on the request of the Indonesian Government.

The primary purpose of the Visiting Team is stated to be to bring leading medical men from Indonesia and abroad into personal contact, and to enable them to exchange ideas on current problems of medical science, thereby stimulating scientific endeavour both in the host country and the home countries of the visitors.

The Team's programme is expected to include a series of special courses for public health officers in each of the centres visited. At the conclusion of the Djakarta phase of the programme, there will be a two-day conference on the problems of medical education.

The Chairman of the Team is Dr. Arvid Wallgren, Professor of Paediatrics at the Royal Caroline Institute, University of Stockholm (Sweden).

ILO SESSION TO DISCUSS SEVEN ITEMS

The Governing Body of the International Labour Organisation has decided that seven items are to be included in the agenda of the ILO'S general Conference in 1954.

The session will be held beginning June 2 at Geneva.

The "technical" questions to be considered will be (1) penal sanctions for breaches of contracts of employment, (2) the conditions of migrant workers in under-developed countries, and (3) vocational rehabilitation of the disabled.

The session will also debate a report by Director-General David A. Morse, fix the ILO'S annual budget, and examine the manner in which countries are fulfilling their obligations in regard to the ILO'S Conventions and Recommendations.

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The ILO'S general Conference opening June 4 at Geneva would consider the adopting of a formal recommendation that young persons under 16 should not be employed underground in coal mines.

The proposed recommendation would require governments to apply the following provisions "as rapidly as national conditions allow."

"1. Young persons under 16 years of age should not be employed underground in coal mines.

"2. Young persons who have attained the age of 16 years but are under 18 years should not be employed underground in coal mines except,

"(a) For purposes of apprenticeship or other systematic vocational training provided, under adequate supervision, by competent persons with technical and practical experience of the work; or

"(b) Under conditions determined by the competent authority prescribing the places of work and occupations permitted and the measures of systematic medical supervision to be applied."

FIGHTING T. B. IN INDIA

Members of the WHO team of medical scientists, while in New Delhi, explained to a meeting of physicians, surgeons, and health administrators how the campaign against tuberculosis would be conducted.

The seminar at which they were speaking was arranged in the Lady Hardinge Medical College by the University Faculty of Medicine. Rajkumari Amrit Kaur was present.

The medical scientists emphasized that in the fight against a disease all aspects of the problem ranging from clinical analysis to the country's available resources must be taken into account and properly co-ordinated. Combating a disease was not the responsibility only of the physician or the health administrator but of every section of society.

Dr. Karl Evang who acted as leader of the seminar said that every country must prepare its plans in accordance with its peculiar national or local factors and the limitations placed by such vital considerations as financial resources and personnel. The pattern followed by one country could not wholly apply to others.

If he were planning a fight against tuberculosis in India, he would insist upon the proper use of drugs and see that no drug was allowed to be used unless it had been thoroughly tested by research scholars. He mentioned the case of streptomycin and how its indiscriminate use had deprived many tuberculous patients of their only chance of cure by this drug and also created streptomycin-resistant bacilli.

Keeping in view the country's limited resources, he would prefer inexpensive isolation beds to beds in modern sanatoria. According to his estimates, it cost over Rs. 5,000 to provide a bed in a modern hospital while an isolation bed could be provided for Rs. 150 to Rs. 350.

As a short-term measure, he would encourage the use of BCG. While treating patients, he would also fix priorities depending upon the extent to which they could infect others.

ANTIBIOTIC TO FIGHT AGAINST TUBERCULOSIS

Dr. Howard Payne, Professor of Medicine at Howard University, Washington, D. C., told the Fifth National Congress of Tuberculosis and Silicosis that a new antibiotic, viomycin, had proved effective in treating tuberculosis cases which became resistant to streptomycin.

Reporting on the treatment of 35 cases of pulmonary tuberculosis with a combination of ciomycin and PAS (para-aminosalicylic acid), Dr. Payne told the Congress, which is sponsored by the Mexican Society for Tuberculosis Studies, that "streptomycin-resistant organisms are sensitive to viomycin, and patients harbouring such organisms improve under intermittent viomycin treatment." Seven of Dr. Payne's patients previously had failed to respond to streptomycin therapy. Even in cases not resistant to streptomycin, he found the new drug clearly effective. Its toxicity was found negligible in the dosages used.

As a control to the group of 35 patients, Dr. Payne maintained 24 others on the widely used combination of PAS and dihydrostreptomycin. After observing both groups over a period of from six to ten months, he concluded that while improvement was more marked in patients treated with streptomycin-PAS, "the effectiveness of viomycin-PAS is definite and demonstrable." This was particularly notable in the seven streptomycin resistant cases.

The development of resistance to streptomycin by tuberculosis organisms is one of the chief stumbling blocks in current therapeutic research on the disease. Streptomycin has been considered for some years the most effective agent against tuberculosis. In the past year, it has shared honours in this respect with the more-recently developed isoniazid (isonicotinic acid hydrazide).

Dr. Payne did not observe any significant degree of resistance to viomycin in his test. In this connection, research scientists believe that emergence of resistance to viomycin may occur more slowly than does streptomycin resistance.

Dr. Payne's paper supports the findings of the U. S. Army doctors, Colonel C. W. Tempel and Captain F. W. Pitts, reported last December before the American Association for the Advancement of Science of St. Louis, U.S.A. Relating the treatment of 834 pulmonary tuberculosis patients, the Army doctors concluded that the results obtained with viomycin and terramycin, combined with streptomycin, nearly equalled the results of treatment with streptomycin-PAS and, in addition, successfully inhibited the development of tuberculosis germs resistant to streptomycin.

WORLD CONGRESS ON FERTILITY AND STERILITY

The First World Congress on Fertility and Sterility is being sponsored by the International Fertility Association in conjunction with the American Society for the Study of Sterility. This will be the First International Congress and the Ninth American Congress on the subject. The world convention will be held in New York City on May 25-31, 1953, the week before the annual meeting of the American Medical Association, also being held in New York City in 1953.

There will be 23 scientific sections dealing with practically every phase of fertility and sterility. Noted scientists of international fame for their investigation in the field are being invited from 48 nations.

In addition to the formal papers, there will be ample time for discussion, questions and answers. Round tables will feature a number of the sessions. Plans are being organized for visitors to attend some of the outstanding Infertility Clinics in the City of New York and also special meetings of various local medical societies in honour of the World Congress.

The Committee on Scientific Exhibits is inviting outstanding exhibitors of prize-winning awards from various countries of the world to come to the Congress and demonstrate their researches.

POST-GRADUATE COURSE IN TUBERCULOSIS

The D. I. G. Civil Hospitals, Bihar, announced that a post-graduate course in tuberculosis open to private practitioners was to start at the Patna T. B. Centre from April 20 1953. A certificate of assiduity will be granted to doctors on the completion of the course which would last six weeks.

NEW ANTIBIOTIC FROM INDIAN PLANT

The discovery of an antibiotic—pristimerin—was announced in a paper, read by Col. S. S. Bhatnagar on March 27, on behalf of the Antibiotic Research Centre, St. Xavier's College, Bombay, at a symposium on antibacterial substances held under the auspices of the Council of Scientific and Industrial Research.

Pristimerin, discovered from an Indian plant, is claimed to be effective against the Viridans group of streptococcus "not affected by the other antibiotics known so far."

Clinical trials over the past two years, it was stated in the paper, produced evidence that this antibiotic could be "satisfactorily employed in controlling infection of the tonsils so very common in children and adults." Experiments are in progress to determine its effectiveness in influenza and the common cold.

BOMBAY MEDICAL COUNCIL

At enquiries held by the Bombay Medical Council on 9th March, 1953, the President announced—

(1) "That the Council do judge Dr. A. V. Ketkar, M.B.B.S. (BOM.) to have been guilty of infamous conduct in a professional respect but do postpone for a period of one year the making of a direction for the removal of his name from the Medical Register subject to the following conditions:—

(i) That the decision of the Council shall be published in the Press. (ii) That Dr. A. V. Ketkar, M.B.B.S.(BOM.) shall not grant certificate of any kind during the period for which the judgment stands postponed.

(2) "That the Council do judge Dr. S. D. Kandarkar, (BOM.) to have been guilty of infamous conduct in a professional respect but do postpone for a period of one year the making of a direction for the removal of his name from the Medical Register subject to the following conditions, viz.:—

(i) That the decision of the Council shall be published in the Press. (ii) That Dr. S. D. Kardarkar, L.C.P.S. shall not grant certificates of any kind during the period for which the judgment stands postponed."

CORRESPONDENCE

The Editor is not responsible for any views expressed by the contributors

CHRONIC AMŒBIASIS AND VITAMIN B

SIR,—Amœbiasis is endemic in Bharatpur. Chronic amœbiasis has been seen here in its protean manifestations. Enlargement with tenderness of liver without actual development of hepatic abscess is the commonest occurrence. Digestive symptoms like vague pain in the abdomen (apart from that in the right hypochondrium), flatulence, gurgling, distaste for food, disinclination to work, distention and lethargy after meals, sour taste in mouth and constipation alternating with diarrhœa are predominant. Most of these symptoms can be accounted for by presupposing partial dysfunction of the liver, which is corroborated by hepatic function tests. But the question arises as to how and why the liver fails. The doubt is raised because firstly, only a part of the liver may be involved in parasitosis—the remaining should be able to carry on the normal functions and secondly, the potential liver reserve is known to be great and the power of regeneration quite effective. In this connection, the following hypotheses are postulated:

(*a*) It may be a condition of toxæmia (although toxins have never been isolated or verified).

(*b*) Infestation of some of the liver cells by *E. Histolytica* results in necrosis, liberating proteins which cause a protein shock or an allergic reaction. Normal liver cells (which have not been involved in parasitosis) get into a state of suspended animation or 'sit down' strike—resulting in liver dysfunction. But this should be only a temporary phenomenon.

If we divert our attention from the liver to some other explanation, it may here be suggested that

(1) Chronically inflamed mucous membrane of the intestinal tract is incapable of efficient absorption of vitamin B complex factors.

(2) Intestinal flora is abnormal in chronic amœbiasis due to altered environments and local manufacture of vitamin B is partially or completely undermined.

(3) Consenquential deficiency of vitamin B complex factors results in abnormal or incomplete enzymatic processes in the body.

That vitamin B complex deficiency does arise is borne out by the fact that many cases have been seen with stomatitis, cheilosis, tenderness of muscles and actual peripheral neuritis. This subclinical or manifest deficiency could be established by assaying the blood. In this connection it is also suggested that melancholia and neurasthenia as met with in some patients are due to this deficiency and not cerebgal parasitosis.

Further, two more suggestions could be put forward to explain the digestive symptoms:—(1) Amœbic cholecystitis chronic. (2) Secondary infection in the intestinal tract. This has been emphasized only recently. Arthralgia or arthritis, which is sometimes met with in chronic amœbiasis, is also ascribed to it. And to achieve complete cure, it is essential to control this secondary infection.

These are some of the points raised in the Symposium on Amœbiasis at the Second Rajputana Medical Conference held recently at Jaipur. That it would stimulate more thought and research is my plea for communicating it. I am, etc.

Bharatpur, B. M. KOTHARY.

AGE, HEIGHT AND WEIGHT STANDARDS OF INSURED EMPLOYEES IN KANPUR

SIR,—The State Insurance of Employees has created a new field in medicine to make a systematic study of the health of the industrial labour. This work which is only a small contribution towards it was conducted on a smaller scale in the State Insurance Dispensary, Rambagh, Kanpur, in the absence of facilities to examine employees in factories. Those manual workers alone, who were suffering from very minor ailments and, had not lost their weight recently owing to any disease, were included in this study. The total number of insured persons examined was 310.

The age was calculated from the date of the birth written in the permanent medical record of each insured person. The workers were divided into two groups vegetarian and non-vegetarian. The vegetarians included in this study were 47.3 per cent. It may be important to add that mostly all the non-vegetarians take the animal food for four to six days only in a month.

The results of the study were as follows: The ages of the employees examined ranged from 17 to 71 years and the average age calculated was 30.3 years.

The stature varied from 4ft. 5½ inches to 5ft. 11 inches and the average height was 5ft. 3 inches.

The lowest recorded weight was 60 pounds and the heaviest person weighed only 146 lbs., when the average weight was 97.2 lbs. Only 6 per cent of them weighed 120 lbs. or more.

The average age and the height of the two groups happened to be approximately the same whereas the average weight of the vegetarian group was 99.6 lbs.

The comment on the above results has been deferred as the latter are self-indicating. Besides, these data may be useful for comparison, after the lapse of a few years when the positive health results may be expected on account of this welfare scheme. I wish to indicate that on interrogation from these workers, I gathered that they had been losing their health since they left their village homes and, joined these factories.

I am indebted to Dr. H. N. Shivapuri, Dy.-Director of Medical & Health Services (Social Insurance), U.P., Kanpur, for his personal guidance and encouragement to work on the health standards of the insured persons. It is hoped the present study will be of some use to other workers in the line. I am etc.

H. S. AMBWANI, M.B., B.S.

State Insurance Dispensary,
Rambagh, Kanpur.

REVIEWS

THE 1952 YEAR BOOK OF GENERAL SURGERY, Edited by Evarts A. Graham, M.D. (with section on Anæsthesia edited by Stuart C. Cullen, M.D.). The Year Book Publishers Inc., 200 East Illinois Street, Chicago 11, U.S.A. Price $6.00 post paid.

This book is one member of the famous family of Year Books, produced and presented in conformity with the other Year Books on subjects covering the entire medical field. The present volume on General Surgery has maintained the consistently high standard set up by its predecessors. The entire subject matter has been divided into several convenient chapters which makes this pocket book of reference all the more useful to busy practitioners. The section on Anæsthesia contains nine chapters in which will be found very good exposition of the modern advancements in anæsthesiology.

Paper, typography, printing, illustrations are all good.

THE JOURNAL OF CLINICAL NUTRITION, Vol. I, No. I, Sept.-Oct., 1952, published bi-monthly by the Nutritional Press, 1631, Walnut Street, Allentown 1, Penna., U.S.A. Subscription foreign $7.00 per annum. Agents for British Commonwealth including India—Bailliere, Tindall & Cox Ltd., 7 & 8, Henrietta Street, London, W.C. 2, Sterling Subscription rate 55 shillings post free., if orders are placed through these agents (B. T. C.)

This is an international journal devoted to and reporting the practical application of our newer knowledge of nutrition. The journal has been started with Dr. S. O. Waife of Indianapolis as the Editor-in-Chief helped by a strong Editorial Board. There is also an Advisory Board with members of established reputation to advise on various subjects like Agriculture, Dentistry, Dietetics, Geriatrics, Home Economics, Internal Medicine, Oral Medicine, Pathology, Pediatrics and Surgery. Besides these, the Editorial Board is always helped by corresponding Editors from foreign countries including Sir Edward Mellanby from London and Dr. A. P. Meiklejohn of Edinburgh. The issue under review is the first number of the first volume and contains articles of a very high order and from the hands of well-established authorities. These include articles like "Basic Research and its Application to

the field of Clinical Nutrition", "Studies on Growth Failure in School Children", "Hypovitaminemia A", "The Effect of Amino Acid Deficiencies in Man" and other articles also of a very high order.

It is not always recognised that nutrition and its abnormalities have got very far reaching effects not only in health but even in disease by modifying the nature, course and intensity of the illnesses and also the reaction of the type to withstand the onslaughts of various sorts of ailments. The journal appears to bring the newer knowledge of nutrition to the hands of all medical practitioners and the quality of the articles seem to ensure a good future. This journal should be in the library of all medical research units and teaching institutions, both undergraduate and post-graduate.

CALCUTTA MUNICIPAL GAZETTE—with New Corporation Supplement and 28th Anniversary number, 1953. Edited by Santosh Kumar Chatterjee. Price eight annas.

This issue of the Calcutta Municipal Gazette celebrates the 28th anniversary of its birth and contains many features dealing with the new set-up of the Corporation under the Calcutta Municipal Act 1951.

As usual with the other previous anniversary numbers, this issue contains a number of very valuable articles by a large number of authors drawn both from officials and non-officials of the Corporation. Several articles deal with the various aspects of the new Act. A few other articles put forth a comparative study of civic affairs.

The articles are not only varied, but many of them are illuminative and highly instructive.

WHAT EVERY ONE SHOULD KNOW ABOUT TUBERCULOSIS—By Dr. M. Santosham, M.B.B.S., F.C.C.P. Published by Crystal Publishing House, Madras. Price Rs. 6-8.

The book is a timely one as Sir A. Lakshmanaswamy Mudaliar in his foreword rightly said that in these days of wide publicity given to laymen in matters pertaining to health and certain diseases, "it is necessary that authoritative views should be conveyed to the general public". Tuberculosis is perhaps enjoying the most publicity now. It is, however, a very difficult task to convey in easily understood ways the entire scientific knowledge on the subject of tuberculosis to the non-medical public. Dr. Santosham has undoubtedly made an admirable attempt to do this. He has intended this book to be useful particularly to the patients and those interested in him, as well as, to rural practitioners who may not be in touch with scientific literature, to unqualified doctors and to social workers. It is also intended to counteract "alarmist propaganda which strikes terror in the hearts" although some of his "few typical true stories" are not very reassuring to a patient.

The book is divided into 21 chapters. The author in his attempt to make the book useful to medical men as well has gone into considerable details which, we are afraid, will not be very easy for the laity to follow clearly. The term "tubercle" has not been used in the usual pathological meaning and has been described to mean a calcified focus.

Although the author admits that to simplify certain complex features he had to be "unconventional" at places, well-known words should have been used to carry their correct and usually accepted meaning.

The book, however, contains a wealth of useful information. It has been well written and compared to the price, the printing and get-up are satisfactory.

THE POCKET PRESCRIBER AND GUIDE TO PRESCRIPTION WRITING—By Alistair G. Cruikshank, F.R.C.P.E. 15th Edition, 1952. Published by E. & S. Livingstone, Ltd., Edinburgh & London. Price 5s. net, Postage 3d. (Reg. 9d.).

This is a nice little pocket book suitable for everyday use as a constant companion to the young house-officers in hospital and the busy general practitioners. The various chapters have been very nicely presented, several of these are of great help specially to the young practitioners. "Some points in practice", "Some points in prescribing", "Incompatibilities" are just a few of the chapters which, though small, are of very practical help to the young practitioners. Several pages are devoted to prescriptions for various ailments grouped in a convenient manner. Many modern remedies, proprietary medicines in common use, have been briefly dealt with. Antibiotics like penicillin, chloromycetin, streptomycin and aureomycin have been considered in separate chapters. Other useful chapters are Posological Tables, Incubation Periods, Enemata, Vitamins D.D.A. Regulations, Monographs of B.P. and B.P.C., etc. The book is handy, compact, neat, well-bound and nicely printed.

TRANSACTIONS OF THE ASSOCIATION OF LIFE INSURANCE MEDICAL DIRECTORS OF AMERICA; Sixtieth Annual Meeting. Edited by James R. Gudger, M.D., Vol. 1952, Recording and Statistical Corporation, New York City.

The Association of Life Insurance Medical Directors of America is a well-reputed body which meets annually where the Life Insurance Companies of the States and of Canada discuss their problems. Actuaries are also invited to this meeting. It is easly appreciated that the best medical talents from amongst university professors also specialists in different subjects are usually taken in as the directors of big life insurance companies.

The discussions that take place in such annual meetings are of a very high order and cover subjects not only on the matter of rating of lives, but also cover extensive grounds from the specialists' points of view on various aspects. The discussions include topics on the latest medical advances, e.g., "Hydrocortisone and Corticotropin, and their utility in Relation to Rheumatoid Arthritis" by Dr. Philip S. Hench, M.D. of Mayo Clinic, "Vagotomy and Subtotal Gastrectomy —Effect on Insurability of Individuals with Gastric and Duodenal Ulcers" by Drs. L. L. McLelland and D. S. Pepper.

Several other papers are also very well-placed and deserve special mention, namely "The Impact of Life Insurance on Public Health" by Ronald F. Buchan, M.D., "Relationships between the Medical Profession and the Health Insurance Council" by Mr. James Andrews, Jr., "The Public Health Situation To-day; Public Health and Civil Defense" by Herman E. Hilleboe, M.D., Public Health Commissioner of New York State. These articles contribute greatly to show the importance of close relationship and interaction between the public health and medical science and practice on the one hand and life insurance medical examinations on the other.

This volume is very illuminating in all its aspects and should be on the table of all medical examiners for life insurances and specially the medical directors of such life insurance companies.

S. C. SEN GUPTA.

SUPPLEMENT

Journal of the Indian Medical Association

VOL. XXII. No. 8 CALCUTTA MAY, 1953

IV ASSAM PROVINCIAL MEDICAL CONFERENCE, NOWGONG

The fourth Assam Provincial Medical Conference held its sessions at Nowgong, on the 29th, 30th and 31st January, 1953. The conference was inaugurated by Dr. B. V. Mulay, the president of the I. M. A. Dr. P. N. Ghose presided over the function. An exhibition was organised which was opened by Sri Jairamdas Doulatram, the Governor of Assam. The scientific session was inaugurated by Dr. H. K. Das and was presided over by Dr. B. V. Mulay in surgical, Dr. R. G. Krishan in gynæcological, Dr. Pai in medicine, Dr. S. C. Dutta in Public Health section. The conference was well attended.

Dr. B. V. Mulay inaugurating the conference, said "The chief advantages of the provincial conferences are many viz. questions of provincial interest are tackled in them, they create platforms of scientific discussions for the old and young professional talents, they offer needful opportunities for creating lasting social contacts and provide stimulus to the ambitious medical youths for making progress. The aggregate effect is seen in the continuous improvement in the efficiency of the general medical profession." He also discussed questions relating to medical education, responsibility of the general practitioners etc. He appealed to the doctors to awaken, co-operate and unite for the good of the nation and the profession.

Dr. H. K. Chowdhary, the Chairman of the Reception Committee accorded welcome to the delegates and visitors. In his speech, he referred to the medical needs of the state and advocated that ways and means be devised to make the country self-sufficient in medicine. Sri Jairamdas Doulatram the Governor of Assam in opening the exhibition said inter alia, "Low resistance of the Indian body is more responsible than any other factor for the poor state of the nation's health. So the main attack on the problem of health in India should on the one hand be in the form of a very extensive and intensive programme of anti-malaria activities and on the other, a well-planned campaign for the production of adequate and appropriate food for both man and animal in India."

Dr. P. N. Ghose, the president in his speech said:

The Conference of the medical men of the State is held annually to discuss the medical problems of the State with reference to (I) Medical Education, (II) Medical Relief, (III) Public Health, (IV) Sanitation and (V) Food and to make suggestions to the Government for their proper solution and improvement. I am not going to deal here with the Medical and Public Health problems of an all-India character but I am going to deal with the particular problems which confront this State and which require special and immediate study and solution.

With scattered villages and horrid communications and inaccessible hills with their different tribes and customs, Assam has peculiar problems of her own and has already attracted the attention of the Central and State Government.

MEDICAL EDUCATION

There is only one Medical Institution in this State—the Assam Medical College at Dibrugarh. It came into existence in November 1947 immediately after the attainment of independence and it has just completed its five years of existence and is now a full-fledged Medical College. The first batch of 13 Graduates—M.B.B.S. came out in June 1952. From that period on two batches of students will come out of the College every year at a half yearly interval. The institution is growing and expanding its activities day by day and is trying its best to keep pace with the progress of Medical Science. Applicants for admission are also increasing year after year, and after filling up the reserve seats, only a few seats are left for the general students. The present rate of admission is 65 yearly and this may be increased to 75 if proper facilities for practical work are available.

DR. P. N. GHOSE, THE PRESIDENT OF THE CONFERENCE

CONDENSED COURSE

More and more L.M.P.s are applying for admission every year for the Condensed M.B. Course and I suggest more seats should be given to them and the seats should be distributed equally amongst (I) Tea Garden Doctors, (II) Private Practitioners and (III) Doctors in the service of Government and Local Bodies.

Time has come when it is necessary to reserve seats of admission on regional or district-wise basis, as it has been found that some of the districts are overrepresented while others are underrepresented or not represented at all. Of course the quality should be not sacrificed in such selections. It is very gratifying to see that girl students are coming in increasing numbers and doing splendidly well in their classes in winning the topmost places in the examinations.

In order to foster competitive spirit amongst our students I would suggest that a certain percentage of seats may be reserved for students of other States and this reservation

should be on a reciprocal basis, so that some of our students may go and get admission in colleges in other States.

Military Training to Medical Students

Military training should be given to the Medical students. During the old Berry White School days such training was given to the L.M.P. students. This practice should be revived and the students be allowed to join the National Cadet Crops.

Ambulance Corps in the Medical College

The students of the Medical College earned the praise of the top-most leaders of our country for their selfless and humanitarian service to the cause of the flood-stricken and earthquake affected people of the State during those grim days of the harrowing devastation of August 1950. A properly organised College Ambulance Corps will be a glory to the college.

Post-Graduate Refresher Course

The Assam Medical College is now a full-fledged institution. It has recently got the recognition of the Indian Medical Council. Time has come now when refresher courses can be arranged for Post-Graduate students.

Rest House for Patients

Patients coming from distant places and also from the neighbouring villages are often stranded for not getting admission in the hospital immediately on their arrival. Sometimes they have to wait for days and weeks to get admission. Most of these patients are generally poor villagers and have not the means to stay in the hotels or other boarding houses in the town. To give them a shelter, a Rest House is an urgent necessity and this may be built near the out patient department. The Medical Officers in the out patient department should be advised to accommodate these patients by admitting them in the hospital by giving them a priority as far as possible.

Selection Board for Post-Graduate Training

For selecting passed graduates for post-graduate training in higher studies in special subjects abroad and in India—a special board composed of medical men only should be appointed immediately to select such students. The Government should make it a point to send at least one student every year, as selected by the board, for special training abroad so that the rank of foreign qualified specialists can ultimately take charge of the various departments of the college. At present there is a great lack of such trained personnel in the State and it is also becoming more and more difficult to get suitable teaching staff from other States as there is a great demand for such men in every State on account of the establishment of new Medical Colleges.

Nursing

The hospital is short of nurses and naturally the patients are not getting sufficient nursing attention. More nurses are wanted. The Mahila Samities and other women's organisations and the Red Cross Societies in the various districts should try their best to persuade our girls in towns and villages to take up the profession of nursing which is considered to be the noblest profession in the world. The Government have very wisely started training centres for nurses in the Medical College Hospital and in some of the State hospitals, and girls are coming in for training in those centres. But more girls are wanted. So in order to attract educated girls and girls of good families better amenities should be provided.

Mental Hospital

This State has a mental hospital at Tezpur. The subject of mental disease forms one of the important chapters of modern medicine and is included in the curriculum of the degree course. The senior medical students are expected to know something about these mental cases and to see and study the patients in the hospital. It is therefore necessary that the hospital should be located near the Medical College at Dibrugarh.

Ayurvedic Medical College at Gauhati

Almost simultaneously with the opening of the Assam Medical College at Dibrugarh, an Ayurvedic Medical College was started by the Government at Gauhati. This college has been functioning since then and is turning out students qualified in the Ayurvedic system of medicine every year. Eminent leaders of the medical profession are unanimous in their views that there should be a sound knowledge of the basic subjects of the modern system of medicine for all those who want to practice the indigenous system of medicine whether Ayurvedic or Unani. It is the synthesis of these two systems of medicine that will give the best results. It is therefore necessary that suitable arrangements should be made in Ayurvedic College for teaching the subjects which are taught in the pre-clinical course of our Medical College.

Medical Relief in the State

Medical Relief in the State is being given through the districts and sub-divisional hospitals and the rural dispensaries. Considering the various medical and public health problems, more hospitals and dispensaries are needed. But there are difficulties in the way, i.e. (I) want of personnel—such as doctors, compounders, nurses, mid-wives, and health visitors (II) and want of funds—which is more or less a chronic problem . Paucity of funds should not stand in the way of providing necessary medical relief and means should be found out to get funds for such vital necessities. It is the want of personnel which is the main obstacle and all attention should be given to train such personnel as quickly as possible without sacrificing the standard. Whereas it may be urgently necessary to open a few new hospitals and dispensaries in mofussil and rural areas, it should be the primary aim of the Government to arrange for immediate and proper facilities for the training of medical personnel in the State. I am glad to say that steps have already been taken by the present Government in that direction.

District and Sub-Divisional Hospitals

Due to constant influx of refugees and of people from villages all our district and sub-divisional towns are getting congested and over-crowded. Incidence of diseases of all kinds is on the increase and the existing hospital facilities are not sufficient enough to deal with these. It is necessary therefore to increase the number of beds in our hospitals specially for Surgical, Gynæcological and T. B. cases. With the advance of medical science and discovery of wonder drugs such as Penicillin, Streptomycin, Chloromycetin, Teramycin and Sulphanomide group of drugs, it is now easy to control quickly some of the most dangerous and lingering diseases, such as, typhoid, dysentery, pneumonia, etc., and beds in our hospitals can be quickly made vacant and we can treat a greater number of cases in a shorter period of time than before. Whereas Malaria, K. A., Pneumonia, Typhoid, Dysentery and Hookworm infections can easily be treated in the out patient department and at home, more beds in the hospital should be allotted to the surgical, gynæcological and T. B. cases except of course for the helpless indigent persons, a few beds may be reserved for common diseases. Here I may suggest that the allotment may be made as follows:

"Surgical 30 per cent., gynæcological 30 per cent., T. B. 25 per cent. and general 15 per cent., so that in a 50 bedded hospital there will be surgical 15 beds, gynæcological 15 beds, T. B. 13 beds and other diseases 7 beds—total 50 beds."

The surgical and gynæcological beds may be adjusted according to necessity.

Free Supply of Antibiotic Drugs to Patients

I should like to point out that the discovery of antibiotic drugs has revolutionised the treatment of some of the most dangerous and fatal diseases. But the cost of some of these drugs is prohibitive and is beyond the means of ordinary men who are generally the victims of such diseases. The indoor non-paying patients in our hospitals should get the benefit of these drugs by their free distribution in the course of their treatment as advised by the Medical Officers in charge.

Medical Relief for Diseases Generally Prevalent

Malaria, K.A., Hookworm, T.B., Typhoid and Dysentery are the diseases generally prevalent in this State. There are occasional epidemics of Cholera and Small-pox in certain districts.

Malaria is an all-India problem and is being tackled by every state according to its means. K. A. being endemic in certain parts of the State, is being successfully tackled by our Public Health Department. Typhoid and Dysentery are most prevalent in urban areas and are getting under easy control with the use of our modern wonder drugs.

Hookworm is one of the most serious scourges in this state in causing disability and death to quite an appreciable part of the population. It is more or less widespread in all the districts, specially in the rural areas and Tea Estates. It is very gratifying to learn that Government have already launched a campaign in certain selected areas against it.

I should like to further add that since hookworm infection is a disease so widely prevalent in this State, proper facilities should be given in the Assam Medical College for research under this head. The Indian Research Fund Association ought to support this proposal as enough clinical materials are available here for the purpose.

Tuberculosis is a world problem. Whereas the western countries have got it under control by steady and persistent campaign for the last half a century, our country has still lately practically done nothing to combat this dreadful scourge. It is only during the last ten years that a sincere attempt is being made to fight the disease. It is not possible for a small State like ours with the meagre funds at its disposal to fight out the disease on all fronts—preventive and curative. There should be collaboration and concerted action between the Centre and the States and the people on their part should whole-heartedly co-operate with the Government so that real benefit may result. The mass B.C.G. Vaccination which is being carried out in the State is a step in the right direction. Poverty, illiteracy, purdah system, early marriages, repeated child births, malnutrition and undernutrition are mainly responsible for the rapid spread of the disease in our country and these should be tackled from the preventive side. It is not merely a medical problem but also a socio-economic problem.

The States have their own responsibilities. But definite plans have not yet been chalked out to combat this fell disease. It is not possible to hospitalise all patients suffering from T. B. In our State there are about 60,000 active cases of T. B. whereas there are only 204 beds in our hospitals for such patients. From the curative aspect it must be borne in mind that T. B. is a curable disease if spotted out early, and on the discovery of some of the wonder drugs, it is getting more and more easy to control this disease and check its spread.

For an early diagnosis of this disease, it is necessary that there should be T. B. Clinics to the District and Sub-Divisional Hospitals and these Clinics should be fitted with x-ray apparatus.

In this State there are already a few Clinics in some of the Districts and the Government can make it a point to open at least one clinic each year in the remaining ones. Our people have become T. B. conscious and the public have been co-operating with the Government in the establishment of such Clinics. The early cases can easily be treated as out patients in these Clinics and with a little knowledge of preventive measures they can safely remain in their homes and enjoy the home comforts along with their treatment. It is in the case of very advanced cases that isolation is necessary so that they may not spread the infection to the other members of the family and for them beds should be reserved in our hospitals.

The Chest Hospital at Shillong can very conveniently be used as a Convalscent Home for those cases who require Sanatorium treatment as recommended by the various Clinics and hospitals. And this will greatly relieve the congestion in the Chest Hospital at Shillong—as the beds will be occupied by the patients only for a short period and not for years together as is happening now. We are greatly delighted to know that an up-to-date Chest Hospital is going to be started at Gauhati out of Lokapriya Bordoloi fund. The more such hospitals are opened the better for the country.

It was originally proposed by the Medical College Advisory Committee to have a 100 bedded T. B. hospital attached to Assam Medical College at Dibrugarh. We do not yet know what has happened to that scheme. T. B. has now become a surgical disease and a properly equipped Chest Hospital attached to Medical College will be a boon to the patients. With all the surgical and bacteriological and x-ray facilities being available on the spot, it will be an ideal place for the treatment of more complicated cases specially for those requiring surgical treatment. Moreover it will be a proper training centre for the under-graduate and post-graduate students who, in the course of time, will be able to take over charge of all our State's T. B. Clinics and Hospitals. I hope the Government will give serious consideration to this proposal and the sooner it is established the better for the state.

Cancer of Larynx is now found to be fairly prevalent in this State and statistics collected by the Professor-in-Charge of the E. N. T. Department, Assam Medical College confirm this fact. Theories have been advanced as to its probable causes, but a proper investigation is very necessary to find out the real cause. For this purpose early steps should be taken by the authorities for carrying out researches under this head in the Assam Medical College.

The Indian Research Fund Association can very kindly help in the matter. There being no member from Assam in the Council of Indian Research Fund Association there is every likelihood that our case is not being properly represented there. We hope, however, that this gap may be filled up in the near future.

Rural Medical Relief

How often it is being preached from the press and platform that our young graduates should settle down for practice in the villages instead of causing congestion in the big cities. Unless and until our villages are sufficiently self-contained with the necessary amenities of life—such as, schools for children, social clubs and libraries, articles of daily necessities, etc. and sufficient clinical facilities for private practice and prospect of a decent income, our young men are not tempted to go there. Even with a guaranteed pay, they do not think it worthwhile to go there because whatever training they get during the 5½ years intensive course of study in the Medical College will be practically of no avail to them and all the money spent for their education by their parents and guardians—in some cases they are reduced to paupers in meeting such expenses—will be considered as lost. Except cases of malaria, K. A., dysentery and worms they will have very little opportunity to see and treat other interesting cases. In the absence of bacteriological, surgical and gynæcological facilities, they have no means at their disposal to treat complicated cases. I would therefore suggest that senior members of the profession whether in service or in private practice be persuaded to go to the villages and render medical help to the villagers and act as their friend, philosopher and guide. Their age and experience in the professional and worldly matters will naturally command respect of the villagers and their mission has every chance of meeting with success.

The villages in this State are far and wide apart. A system of Mobile Hospital Unit may be started to cater to the needs of the villages where the communication is good. What our villages now need most is help in maternity and child welfare. With the apalling death rate amongst women and infants under one year of age in our country all attention should be focused on his urgent problem and all available resources should be pooled together to put a stop to such a rot. In rural areas maternity and child welfare centres should be opened with a trained mid-wife and a lady health visitor.

Medical Relief: Srimanta Sankar Mission

In this connection I can not but refer to the humanitarian activities of that volunteer organisation—Srimanta Sankar Mission—which is doing immense service to the cause of suffering humanity in this State. This organisation is named after our great savant Srimanta Sankardeo who was

born at Bordowa—a few miles north of this town. It was he who brought hope and enlightenment to the people of this province by raising their social and cultural level which had fallen during the past ages. The mission is giving relief to masses suffering from disease of their eyes—thus preventing blindness wherever and whenever it is possible. The Eye Hospital here and the mobile Eye dispensary have removed to a great extent one of the crying needs of the State by providing facilities to the common man for treatment of blindness.

Public Health

Cases of malnutrition, due to lack of good nourishing food, are met with in increasing numbers in our every day practice. And these people ultimately fall a victim to such wasting diseases such as T. B., Malaria, Anæmia, etc. Women and children are special victims and maternal and infant morbidity and mortality are daily on the increase. Sufficient attention has not been paid to the health of the mother and the child and also to the health of our school and college boys and girls.

Arrangements for periodical health examinations of our college and school boys and girls should be made immediately. The Government can easily have the whole-hearted co-operation in this matter from the members of the Indian Medical Association and also from such volunteer organisations such as the Srimanta Sankar Mission who has been rendering immense help to the poor and afflicted by their mobile hospital unit.

The amalgamation of the Public Health Department and the Medical Department in this State which is under contemplation of our Government is a step in the right direction as work can be done smoothly and quickly under one head. We hope the Government will give effect to this scheme without any delay.

Food

Lack of good nutritious food is mainly responsible for all the ills we are suffering from. How to improve our food? This is a problem. Milk, fish, meat and eggs are necessary for our proper nutrition of which milk is the most important one as it is taken both by vegetarians and non-vegetarians. But to our misfortune, milk has become a rare commodity.

Fish is abundant in this State but the supply is very meagre compared to the demand. Proper marketing facilities with improvement of transport can do a great deal to remove the scarcity.

The cost of these essential articles of food, such as milk, fish, meat and eggs has become so prohibitive that for the common man these things have become a luxury. Except for a fortunate few the mass is in a state of semi-starvation. The Ministry of Health should give sufficient attention to this vital problem of nutrition of the people by making these articles of food easily accessible to the common man within his limited means.

Adulteration of Food and Drugs

Adulteration of food and drugs has become our religion rather than a sin. Even the most important and useful medicines are being adulterated and spurious drugs are being sold in the market in the garb of genuine drugs. Our profession ought to be careful about this. We are glad to say that the State Governments are already on the alert in taking proper steps to stop the evil. Nothing but drastic punishment should be meted out to these offenders.

Community Projects

The scheme of Community Projects which has been put into operation in some of the selected parts of the State, provides plans for an all round development and improvement of our villages. We earnestly hope that the scheme will be a success and will gradually be extended to other parts of the State.

I. M. A. and Government

During the British rule the I. M. A. was not in the good books of the Government because our association being composed mostly of Indian medical men voiced the national feelings and aspiration of the people in matters of medical education, public health and medical relief in the country. Now we have got our National Government and we earnestly hope that in such matters our Government will take our Association in their confidence and give proper consideration to its views and complaints. Our co-operation will always be forthcoming and we do sincerely hope the Government on their part will be responsive, as mutual discussion and understanding in such technical matters will be helpful in producing economical and constructive results.

I. M. A. and A. I. M. L. A.

Amalgamation of these two bodies is eagerly awaited by our profession, as a single united body in a small state like ours will carry more weight with the Government.

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RESOLUTIONS PASSED AT THE CONFERENCE

1. Resolved that this Conference expresses its heartfelt sorrow at the sad demise of the following members of the profession and conveys its sympathy to the members of the bereaved families.

(1) Dr. N. Rahman—Golaghat.
(2) Dr. G. K. Deb—Gauhati.
(3) Dr. Jina Ram Das—Pathsala.

2. Resolved that the State Government be requested to unify the Cadre of the Asst. Surgeon Grade I & II and to form a single Cadre of Asstt. Surgeons.

3. This Conference urges the Government to take up all the dispensaries and hospitals now under the management of the Local Boards and Municipalities, gradually within a period of ten years, as the existing state of medical relief, management and service conditions are very unsatisfactory.

4. This Conference recommends to the Government to introduce the system of proper medical inspection of students of all Colleges and Schools in the State. Some of the hostels attached to schools and colleges are in very unsatisfactory state from hygiene point of view and proper steps be taken immediately to improve them.

5. Be it resolved that a first class school of nursing be established immediately at Dibrugarh attached to the Assam Medical College with proper teaching staff and proper hostel arrangements and amenities in order to attract educated girls and girls of good families to take up the profession of nursing.

6. Resolved that immediate steps be taken by the Government to train suitable graduates in increasing numbers for post-graduate training in higher studies in special subjects either abroad or in India, so that, they can ultimately take over charge of the various departments of the Medical College and other special departments of the State.

7. This Conference requests the Government to appoint immediately three properly qualified anæsthesists in the Assam Medical College.

8. This Conference requests the Government to take proper steps to teach dentistry as a special subject in the Assam Medical College.

9. Resolved that Government be requested to modify and revise the existing rules regarding distribution of fees

XIX ANDHRA PROVINCIAL MEDICAL CONFERENCE

The 19th Andhra Provincial Medical Conference will be held on the 2nd and 3rd of May, 1953, at Masulipatam. There will be a symposium on "VENEREAL DISEASE".

realised from indoor paying patients and patients attending the out patient departments so that the whole amount be credited to the hospital fund, to be spent for the welfare and comforts of the patients and improvement of the hospitals.

10. This Conference requests the Government to reconstitute the Governing Body of the Assam Medical College so that majority of members be from the medical profession who are representatives of the I. M. A. and that the President be elected from amongst its members.

11. Resolved that the Government be requested to introduce refresher courses in all subjects in the Assam Medical College, Dibrugarh.

12. This Conference requests the Government to adequately increase the allowance of the Medical officers in whole-time charge of the Jail Hospitals.

13. The State Government be requested to abolish the system of nomination of members to the Assam Medical Council so that all members are elected.

BRANCH NOTES

ALLAHABAD MEDICAL ASSOCIATION—The annual meeting of the association was held on 14-2-53 with Dr. Brij Raj Kishore in the chair. Office-bearers for the year 1952-53 were elected with Dr. Brij Raj Kishore as president and Dr. S. K. Mukerji as secretary. The annual report of the association for the year 1951-52 shows an increase in membership and an increase in the number of meetings held. Nine general meetings, 9 clinical meetings and 2 Executive Committee meetings were held. The following papers were read in the meetings—(1) Role of Medical Profession in Pharmaceutical Industry by Dr. S. K. Roy Chowdhury (2) Thoracoplasty and other surgical operation in the treatment of Pulmonary Tuberculosis by Dr. D. N. Kesharbani (3) Medical work in China under Communists—Dr. D. N. Kesharbani (4) Scopes and indications of Deep X-Ray Therapy by Major M. K. De (5) Treatment of Acute and Chronic Osteomyelitis in general practice by Capt. R. R. Koty (6) Principles in the treatment of Amœbiasis by Dr. Debabrata Barat.

ANDHRA PROVINCIAL BRANCH—The 19th Andhra Provincial Medical Conference will be held at Masulipatan early in May 1953. There will be the annual meeting of the provincial council before the conference. Two scientific sessions will be held, and there will be a symposium.

The branch announces an essay competition open to all members of the branch. The subject selected is "How can rural areas be best served by modern science." Dr. Gurumurty memorial prize (1953) will be awarded to the best writer.

ASSAM PROVINCIAL BRANCH—A meeting of the working committee of the branch was held on 28-1-53. Dr. B. Barooah presided. Eight members were present. The members condoled the death of (1) Capt. N. Rahman (2) Dr. G. K. Deb. The audited accounts for 1951-52 were adopted. The report of the Assam Medical Relief Committee was discussed.

The 3rd annual council meeting of the branch was held at Nowgong on 29-1-53. Fortyone members were present. Dr. (Mrs.) T. Rai Chaudhuri was in the chair. Condolence resolutions were passed on the death of Capt. Nurul Rahman (Golaghat) and Dr. G. K. Deb (Gauhati). The secretary informed that 2 new branches were opened. The proceedings of the Working Committee meetings were discussed and confirmed. In the adjourned meeting of the above council held on the same date, the budget for 1752-53 was accepted. A sub-committee was formed to frame the rules and regulations of the Assam Provincial Branch. It was resolved that the sub-committe formed for the drafting of the constitution of the branch be asked to redraft the rules and regulations of the Assam Medical Relief Committee.

BANGALORE BRANCH—A clinical meeting of the branch was held on 3-1-53. Dr. M. Gurudas demonstrated some interesting skiagrams, viz. a case of Pancreatic calculi, Dermoid cyst of the Lung, Pott's disease of the Thoracic Vertebræ with paravertebral abscess simulating a lung consolidation in the A. P. view of the chest. He also showed a few cases of fractures of the carpal navicular, spiral fracture of the Tibia and condyle of the Humerus. Next the general body meeting of the branch started with Dr. M. S. Mehkri in the chair. The Director of Posts and Telegraphs was requested to reduce the rental value of Telephones in Mysore for doctors.

In the clinical meeting held on 8-1-53, Dr. L. S. Doraswami spoke on "Essential principles in the treatment and prevention of the spread of Pul. Tuberculosis." Dr. T. K. Dayalu presided. Forty two members attended the lecture.

BELLARY BRANCH—The annual report of the branch for 1951-52 shows a slight fall in membership. The attendance of members at the meetings was fairly good. There was an all round progress in the activities of the association, especially the clinical meetings.

BENGAL PROVINCIAL BRANCH—The annual report of the branch for the year 1951-52 shows that during the year, 3 ordinary meetings of the council were held. The attendance of representatives of the local branches at these meetings was not satisfactory. The working committee met once every month. The standing committees held several meetings during the year and dealt with various problems referred to them by the W. C. The refresher course arranged by the branch was very popular. One hundred and seventeen members enlisted for the course. Three rural medical conferences were held during the year, (1) at Pandua on 9-3-52, (2) at Chandrakona Ghat on 20-4-52 and (3) at Tareskeswar on 25-5-52. The branch discussed West Bengal Clinical Establishment Act and the Employee's State Insurance Scheme and gave its opinion on the Draft Five Year Plan. The 3rd Commonwealth Medical Conference was held in Calcutta from 20—23 March, '52 at the invitation of I. M. A. The Bengal Medical Relief Committee of the branch undertook medical relief work in the food scarcity areas of 24-Parganas and amongst refugees at certain outposts of West Bengal. In membership, a drop is noticed and this has been explained as due to reduction of direct members and a fall in the membership of Calcutta Branch. The financial position showed improvement.

BHABANAGAR MEDICAL ASSOCIATION—The association announces the sad and untimely death of Dr. H. L. Vaidya, the immediate past president of the association. Dr. Vaidya breathed his last on 19th February, 1953.

BHOWALI BRANCH—A meeting of the branch was held on 4-1-53, with Dr. (Mrs.) Khazan Chand in the chair. Dr. B. C. Arora read a paper on Tuberculosis and Pregnancy.

BOMBAY BRANCH—A meeting of the Managing Committee of the branch was held on 7-1-53. Ten members were present. The minutes of the last meeting were confirmed. Three new members were admitted.

A meeting of the Managing Committee was held on 24-3-53. Dr. H. V. Tilak presided. Eleven members were present. Condolence resolution on the death of Dr. A. D. Mastkar was passed. The accounts for the period ending 24-3-53 were passed. Twelve new members were admitted. The secretary informed that the branch has been registered under the Bombay Public Trust's Act under protest.

BOMBAY WEST SUBURBAN BRANCH—At the biannual meeting of the branch held on 1-3-53, Dr. C. S. Thakur the senior Vice-President of I. M. A. and president of the branch, in his speech referred to the inadequate medical services in the suburbs of Greater Bombay. He said "Here in the suburbs where we migrated many years ago, we are in a primitive atmosphere so far as medical relief is concerned." He described the levy of sales tax on drugs and surgical dressings and instruments and hospital equipment as a pernicious measure as it operates against the call of humanity. Regarding prohibition he thought that prohibition policy of the government should be moderated because no man-made laws however rigorously and fiercely enforced can achieve the object of prohibition.

Dr. Thakar discussed elaborately the Employee's State Insurance Scheme and pointed out that the capitation fee offered by the Government is meagre and unacceptable. He refuted the charge that "we are holding up the advent and progress of the Employees' State Insurance Scheme by our excessive demands. The fault is at the doorstep of the corporation who does not wish to grant adequate remuneration

DR. C. S. THAKAR, PRESIDENT, BOMBAY WEST, SUBURBAN BRANCH, I.M.A.

to the Insurance Officer." In conclusion he said "I wish to refer particularly to the part that a medical man can play in the social and political field by reason of his training, his social and personal contacts, his great opportunities for close study of the many problems that surround the hearths and homes he visits and lastly the power he can weild in moulding and shaping public opinion in right channels. This makes a medical man a great factor and an asset in public life."

BULAND SAHAR BRANCH—Office-bearers for the 1952-53 of the branch were elected with Dr. D. P. Sharma as president and Dr. Ratan Lall Khanyi as secretary.

CHETTINAD BRANCH—A meeting of the branch was held on 24-1-53. Dr. Subramaniam presided. Dr. V. Iravathem gave an interesting talk on "Some recent advances in blood transfusion therapy."

The annual meeting of the branch was held on 15-3-53. The annual report was presented and office-bearers were elected with Dr. D. O. Sendal as president and Dr. M. Srinivasam as secretary. Dr. R. Subramaniah spoke on "Some recent advances in treatment of medicine." Dr. A. N. Subbaraman spoke on "Hematemesis and its treatment."

CHINGLEPUT DISTRICT BRANCH—The general body of the branch met on 30-11-52 with Dr. P. S. Sreenivasan in the chair. Before the regular business was started, a condolence resolution on the death of Dr. C. V. Ekambara Mudaliar, was passed. The statement of accounts for 1951-52 was accepted. Office-bearers for 1952-53 were elected with Dr. P. S. Sreenivasan as president and Dr. R. Varadarajan as secretary. The ordinary meeting of the branch followed just after. Dr. S. R. Bhat read a paper on Dental Diseases as a source of focal sepsis.

COIMBATORE DISTRICT MEDICAL ASSOCIATION—A meeting of the association was held on 12-2-53 to accord welcome to Dr. U. Krishna Rao, Minister for Labour, Industries and Transport. Dr. I. Pichai Robert presided.

The annual general body meeting of the association was held 19-2-53 with Dr. I. Pichai Robert in the chair. Eighty members were present. Dr. P. N. Ramasami was elected the president of the association for the current year and Dr. S. Ganapatty the secretary. Dr. P. Govinda Rao gave a lecture on "Male Genital Surgery" which was highly appreciated. The annual report of the association for the year 1952 shows that there were 13 meetings during the year and three meetings of the managing committee. The attendance at all the meetings was satisfactory. The membership showed a decrease by 28.

DEHRA DUN BRANCH—The annual general meeting of the branch was held on 20-12-52. The annual report for 1951-52 with the audited accounts was passed. Office-bearers for the year 1952-53 were elected with Dr. Mitra Nand as president and Dr. Jagmohan Singh as secretary. The annual report of the branch for 1951-52 shows no change in membership position. One emergency meeting, seven monthly meetings and five executive meetings were held during the year.

A meeting of the branch was held on 6-1-53 with Dr. Mitra Nand in the chair. Dr. Rammurti narrated his experiences of the All-India Medical Conference at Patna. Dr. Mitra Nand showed an interesting case of facial paralysis complicated with infantile paralysis. Dr. M. P. Chelavandi showed an interesting case of submaxillary cyst.

A clinical meeting of the branch was held on 3-2-53. Twenty-three members were present. Dr. Durga Parsad read a paper on Hemiplegias with special reference to a case of cerebral thrombosis. The president announced the opening of the reading room in civil hospital.

DHARWAR BRANCH—The report of the branch from 1-10-52 to 31-1-53 shows that the branch held 6 meetings. Papers on Infantile Cirrhosis by Dr. Bhende; Germ Warfare by Dr. M. R. Dhamdhere and Aureomycin by Dr. S. W. Gokhale were read. Drs. B. H. Kamalpur and H. V. Upadhye spoke on "Antenatal care" and "Infant feeding" in meetings of ladies during Baby Health Week. Drs. N. B. Kabbur and S. M. Vaingankar spoke on different aspects of Physical Education to primary teachers.

DHANBAD SUB-DIVISIONAL BRANCH—A special general meeting of the branch was held on 10-2-52, under the presidency of Dr. A. N. Ghatak. The members condoled the sudden death of Dr. Natai Charan Banerjee who was a very popular member of the branch.

DHUBRI BRANCH—A report of the branch of the preceding year shows that 4 clinical meetings and 2 general meetings were held and the following subjects were discussed, (1) Intravenous Iron therapy in pregnancy anæmia, (2) Use of Synthetic antimalarial drugs (3) a case note of cerebro-spinal fever.

DAVANGERE BRANCH—The report of the branch shows slight increase in the membership during 1952. The monthly clinical meetings were regularly held. Dr. K. S. Shadaksharappa delivered lectures on Myœdema, A.C.T.A. Lung Abacess, Pericarditis with Effusion and successful operations of Intussusception, Dr. H. K. Krishnaswamy on Chronic Skin Disease; Dr. K. S. Shadaksharappa on Rheumatic Heart Disease and Dr. S. T. Puttanna on Medical Ophthalmology.

EAST GODAVARI BRANCH—At the annual meeting of the branch held on 24-1-53 Dr. Venugopal spoke on "The Symptomatology, diagnosis and treatment of calculi in the Genitourinary tract". There was also a film show on Tolserol and nutritional aspects of tropical diseases.

FAIZABAD BRANCH—An extraordinary meeting of the branch was held to record its deep sense of sorrow at the sudden death of Capt. P. L. Banerji, a prominent member of the branch.

FARRUKHABAD CUM FATEGARH BRANCH—The annual report of the branch for 1951-52 shows an increase in membership. The branch held 7 general meetings and 6 clinical meetings. The following subjects were discussed (1) Latest treatment of T. B. by Dr. H. L. Visacher (2) Man made malaria by Mr. J. N. Kar (3) Present day therapeutics and surgery in the army (4) Place of cortisone in modern therapeutics (5) x-ray films by Dr. B. N. Sareen (6) Interesting clinical and operated cases by Dr. Mrs. Chhotey Lal. Dr. R. D. Sherma and Dr. G. B. L. Srivastava. Office-bearers for 1952-53 were elected with Dr. Mrs. Chhotey Lal as president and Dr. I. N. Saxena as secretary.

FEROZEPUR BRANCH—A meeting of the branch was held on 17-2-53 with Dr. Raja Ram Bhola in the chair. Twenty-one members were present. Dr. K. Moti Singh spoke on Hypertension and its treatment. He also demonstrated 3 cases.

An extraordinary meeting of the branch was held on 14-3-53 under the presidentship of Dr. Raja Ram Bhola. Twenty-six members attended. Dr. Sushila Nayar, Minister of Health addressed the members on "The role of Medical Practitioners on Social Health problems in free India." She said that in India more concentrated effort should be made on the preventive rather than the curative measures. Doctors should take more interest in improving Public Health than merely treating the sick. In conclusion she said "we have achieved freedom but we have yet to achieve freedom from hunger, want and misery."

GARHWAL BRANCH—The new office-bearers of the branch have been elected with Dr. O. P. Jain as president and Dr. B. R. Negi as secretary.

GHUGUDANGA BRANCH—A meeting of the branch was held on 22-2-53 with Dr. S. S. Sarkar in the chair. Fifteen members were present. A discussion was held about Sinthee-Ghugudanga Anti-Tuberculosis Clinic for opening the chest clinic there. An interesting film on Coarctation of aorta and tolserol was shown.

HAPUR MEDICAL ASSOCIATION—Office-bearers of the branch for the year 1952-53, have been elected with Dr. D. D. Ahuja as president and Dr. M. L. Goel as secretary.

JABALPORE MEDICAL ASSOCIATION—The annual medical dinner of the association was held on 21-2-53. Dr. P. K. Pradhan presided over the function. Dr. R. P. Nigam, Professor of Surgery, Medical College, Nagpur, was the guest of honour. Dr. Sarvate reviewed the history of the association from 1921 when it was started with 6 members, the present strength being 74. Dr. Nigam then gave his views on medical education and teaching institutions of the present day. He also spoke on the year plan of preventive medicine.

JAIPUR MEDICAL ASSOCIATION—An At Home was held on 10-2-53. Films on (1) Aureomycin (2) Folvite and (3) Control of filariasis by Hatrazan, were shown.

An At Home was arrange by the Association to thank Shree Seth Sohan Lal Dugar for the following donations (1) Rs. 1,500/- to Jaipur Medical Association (2) Rs. 3,000/- to S. M. S. Medical College Library (3) Rs. 1,500/- to Maternity Welfare Centre, Jaipur (4) Rs. 100/- to Mental Hospital for purchase of books (5) Rs. 100/- to Leper Asylum for purchase of books.

JALGAON BRANCH—A meeting of the branch was held on 22-2-53. It was decided to send seven representatives to the District Medical Relief Sub-Committee.

KARNAL DISTRICT BRANCH—A meeting of the branch was held on 22-2-53 with Dr. Nirmal Parkash in the chair. Dr. Munchi Singh read a paper on Infantile Diarrhoea.

KARIMNAGAR BRANCH—A clinical meeting of the branch was held on 23-2-53 with Dr. N. R. V. Swami in the chair. It was resolved to start first aid training centres at the district and taluk headquarters. It was also resolved to give due publicity to the Eye Camp that is shortly to be started by the Government. Dr. N. R. V. Swami spoke on "Congenital Syphilis". Dr. Gulam Murtaze demonstrated a case of Whooping Cough and Dr. Bhoom Reddy presented a case of T. B. Lung with pleural effusion.

KIRNAHAR BRANCH—The annual meeting of the branch was held on 3-2-53 with Dr. M. M. Mandal in the chair. Dr. K. K. Mukherjee was elected the president of the branch for the year 1952-53 and Dr. K. G. Chandras, the secretary. The meeting regretted that no representative of this branch was included in the advisory committees of Kirnahar A. G. Hospital and Kirnahar Charitable dispensary.

KOTHAGUDIUM BRANCH—A clinical meeting of the branch was held on 17-1-53 with Dr. T. C. Ramchandani in the chair. Dr. Ramchandani spoke on his impressions of the 14th All-India Surgeons' Conference at Vellore and of the surgical work done in the general hospital, Madras.

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A clinical meeting of the branch was held on 6-3-53. Dr. T. C. Ramchandani presided. Dr. S. V. Ghurye demonstrated 5 cases of cardiac failure with skiagrams.

K. G. F. BRANCH—A demonstration of technical medical films on some aspects of spinal and general anaesthesia was arranged under the auspices of the branch on 19-1-53. There was a good attendance of members.

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A clinical meeting of the branch was held on 31-1-53 with Dr. (Miss) J. Dominick in the chair. Dr. (Mrs.) E. R. Nathan detailed her experiences with cases of 'retained menses' and 'foreign bodies in the uterus'. Dr. T. S. Sambasivan demonstrated a case of 'essential hypertension' and read case reports on the chloromycetin treatment of typhoid fever and streptomycin treatment of cholera.

LABAC BRANCH—The annual general meeting of the branch was held on 24-9-52. Ten members were present. Dr. H. C. Chakravarty presided. Dr. S. C. Ghosh was elected the president and Dr. C. K. Home, the secretary of the branch for the next year. The annual report was adopted.

MADRAS BRANCH—In the annual general body meeting of the branch held on 10-12-52, Dr. R. Sankaran was elected the secretary of the branch who would be in-charge of the office and all matters excepting the clinical and scientific meetings of which Dr. N. A. Iyengar would be in-charge.

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A meeting of the executive committee of the branch was held on 12-2-53 Dr. P. Natesan presided. Twelve members were present. At the outset, condolence resolutions on the death of Sri N. Gopalaswami Iyengar, Minister of Defence, Government of India, and Capt. T. C. Gopalan of Madras, were passed. It was resolved to give a reception to the members of the visiting team of medical scientists sponsored by WHO and USC on 2-3-53. It was also decided to meet Mr. Aneurin Bevan, former health minister of U. K. Statement of accounts as presented by the Hony. Treasurer was approved. Statement of accounts of the reception given on 27-10-52 to Dr. L. H. Bauer was also passed. Three new members were admitted.

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An executive committee meeting of the branch was held on 7-1-53 with Dr. P. Natesan in the chair. Fourteen members were present. The minutes of the executive committee meeting held on 14-11-52 and the annual general body meeting held on 10-12-53 were confirmed. Thirty-four members were admitted. The rules committee was formed.

MADURA MEDICAL ASSOCIATION—The annual meeting of the association was held on 21-2-53 with Dr. M. N. Rajan in the chair. At the outset, the meeting condoled the death of Lt.-Col. Lesleigh a former member of the association. New office-bearers for the year 1953 were elected with Dr. A. S. Annamalai as president and Dr. P. A. Y. Narayanan as secretary. The budget for 1953 was passed unanimously. The meeting requested the authorities to relax the rules for issue of licences for possession of methyl alcohol and see that the import facilities of the product from other states were rendered easier.

MALABAR BRANCH—A meeting of the branch was held on 21-3-53 with Dr. C. K. Menon in the chair. The members condoled the death of Dr. K. R. P. Chidambaram and Dr. P. S. Subramanya Iyer. Dr. C. R. Parasuram read a paper on "The value of rectal examination in general practice." The meeting thanked the Government of Madras for rescinding their orders for vacating the Hacket Wilkins Memorial Hall.

MYSORE MEDICAL ASSOCIAION—The 6th provincial council meeting was held on 5-2-53 with Dr. B. R. Ramalinga Reddy in the chair. Twenty members were present. Dr. M. Kothandaram, member of the working committee was also present, by invitation. Dr. K. N. Chakrasekharaswamy was elected treasurer in place of Dr. R. Nagendran resigned. Arrangements for holding the annual conference were explained. Five members of the provincial council were elected to the Subject Committee.

A meeting of the subjects committee was held on 7-2-53. Fifteen members were present; Dr. B. V. Mulay attended by special invitation. Resolutions were scrutinised.

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The Second General Body meeting was held on 7-2-53. Two hundred and forty-five members were present. The members condoled the death of Drs. B. R. Ramkrishna Rao, B. B. Bharda, Subbakrishna Setty, Krishnamacharu, Khande Rao and Ranganath Iyen. The secretary's report up to 1st January was adopted. Resolutions passed by the subjects committee were discussed.

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The secretary's report for the year 1952, shows that the 20th annual conference was held in December, 1951. An ad hoc committee was formed on 22-1-52 to select candidates for internships in foreign countries. The provincial council met on 3-2-52, 10-8-52 and 9-11-52. The Working Committee met on 8-3-52, 25-7-52, 23-11-52 and 14-12-52. A refresher course was conducted for 14 days from 8-9-52 to 21-9-52. Forty-one doctors attended it.

NAGAPATTINUM BRANCH—A meeting of the branch was held on 27-11-52 with Dr. J. Y. Arthur in the chair. Sixteen members were present. Dr. Ramma Rao gave an interesting lecture on "Bedside diagnosis of common Lung Diseases". This was followed by a film demonstration on Prevention of Tuberculosis and Small Pox.

NAGPUR BRANCH—The annual general meeting of the branch was held on 17-1-53. Office-bearers for 1952-53 were elected with Dr. N. R. Pandey as president and Dr. R. D. Bhusari as secretary.

NELLORE DISTRICT BRANCH—A meeting of the branch was held on 24-1-53 with Dr. D. Raghava Rao in the chair. A symposium on scorpion sting was arranged. Dr. Rao opened it and all the members participated in it.

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In a meeting of the branch held on 21-2-53, a clinical talk was given in which Dr. E. M. Sastry presented a case of Pemphigus Vulgaris.

ONGOLE BRANCH—A meeting of the branch was held on 21-2-53. Dr. C. Raghavacharyulu presented the progress of a case of Polioencephalitis, Dr. Paul Durkee of the Kugler Hospital, Guntur, spoke on 'Intravenous Fluid Therapy". This was followed by a lively discussion.

PATNA MEDICAL ASSOCIAION—The annual general meeting of the association was held on 31-1-53 with Dr. (Miss) H. P. John in the chair. Attendance was fairly large. Office-bearers for the year 1952-53 were elected with Dr. D. Ram as the president and Dr. A. K. Sen as secretary.

The annual report of the association for the year 1951-52 shows that five executive meetings (4 ordinary and 1 emergent) were held during the year. The audited account shows a fall in the closing balance as compared with the closing balance of the previous year. The branch had several clinical and public utility lectures.

PORBANDAR BRANCH—A meeting of the branch was held on 22-2-53 with Dr. H. H. Chavda in the chair. Eighteen members were present. Dr. M. C. Sanghavi read a paper on "Some Notes on Allergy". Next Dr. S. N. Baxi, Hony. Physician, Irvin Hospital, Jamnagar who attended the meeting on invitation, spoke on 'Diseases of the Genito Urinary System' which was followed by a lively discussion. X-ray plates of 'Paget's Disease' of 'Mono-Osseous' type were also shown.

PUNJAB STATE BRANCH—A meeting of the provincial state council of the branch was held on 8-2-53. The fee offered to the medical profession by the Director-General, E. S. H. I. Scheme was the main subject of discussion. The council called upon members of the profession to stand by the association and not to negotiate with the Government individually as is being tried. A sub-committee was formed to discuss all problems relating to the above matter.

SHIMOGA BRANCH—A meeting of the branch was held on 7-3-53 with Dr. B. L. Shamanna in the chair. When this meeting was over, the meeting under the auspices of the rural community project scheme of the Mysore State commenced and the first of the series of popular lectures under the rural health education programme of the branch, was given by Dr. T. N. Sreenivasa on 'Back ache, its causes and remedy thereof', illustrated by x-ray pictures.

SOUTH INDIAN PROVINCIAL BRANCH—The annual Provincial council of the branch met on 20-9-52 with Dr. K. C. Nambiar in the chair. Thirty-four members were present. Amendments and alterations to the rules of the provincial council as recommended by the rules sub-committee were provisionally accepted by the council. The short term medical course for work in rural areas as proposed by the Madras Government was in the opinion of the council, fraught with danger. The annual report for 1951-52 was adopted, so also the budget estimate for 1952. Dr. A. G. Leelakrishnan was declared elected as Hony. Secretary.

SULTANPUR BRANCH—The annual report of the branch shows a decline in membership, mostly due to transfers. Four meetings were held during the year and the following subjects were discussed; (1) Acute abdominal pain (2) Infective hepatitis (3) Uterine fibroid. Office-bearers for 1952-53 were elected with Dr. S. S. Misra as president and Dr. S. Banik as secretary.

TANJORE DISTRICT BRANCH—A meeting of the branch was held on 18-1-53. Twenty-five members were present. Lt.-Col. C. S. V. Ramanan spoke on "Army Medical Service".

TENALI BRANCH—A meeting of the branch was held on 28-2-53 with Major K. Vulakki in the chair. Dr. V. Suryanarayana described the life sketch of late Col. Smith, the famous Ophthalmic Surgeon whose anniversary has fallen on the same day of the meeting. Next the symposium on "Abdominal Emergencies—medical and surgical" was opened by Dr. C. Krishnaiah, Capt. Imaduddin and Dr. K. Bhimeswara Rao participated in it. Capt. Imaduddin also demonstrated a case of Pellagra.

TEJPUR BRANCH—A meeting of the branch was held on 17-12-52 with Dr. H. C. Das in the chair. Ten members were present The meeting finally selected the president for the next provincial conference.

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A meeting of the branch was held on 17-1-53 with Dr. H. C. Das in the chair. Ten members were present. Dr. H. C. Das gave a comprehensive description of the 29th All-India Medical Conference held at Patna. It was decided to approach the chairman, Tejpur Municipal Board for a plot of land to erect a club building for I.M.A.

TIRUCHY BRANCH—In a meeting held on 7-2-53 under the presidency of Dr. T. S. Balasubramanyam it was made known to the members that the Managing Committee proposed to purchase a plot of land for the association building. Dr. K. Narayanamurthy of Madras gave a talk on Clinical, Biochemical and Radiological findings during a 58 days' fast. Fifty members were present.

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A general body of meeting of the branch was held with Dr. T. S. Balsubramanyam in the chair. Fifty members were present. The meeting approved of the steps taken by the executives to purchase the site for the construction of a building for the association.

A meeting of the branch was held on 21-2-53. Fifty-five members were present. Dr. V. Ramalingaswamy gave a talk on "The relation of liver disease in infancy and childhood to nutrition. After the lecture, a film on "Aureomycin" was shown to members and this was very much appreciated.

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A meeting of the branch was held on 7-3-53 with Dr. T. S. Balasubramanyam in the chair. Forty-three members were present. Dr. K. C. Nambiar, S. I. P. Branch, gave a talk on "Acute Abdomen" which was followed by some x-ray films demonstration.

TIRUNEVALI DISTRICT MEDICAL ASSOCIATION—A meeting of the association was held on 31-1-53. Thirty-five members were present. Dr. K. Rama Ayyar assisted by Dr. L. Venkata Vittal showed a few cases of extra pulmonary tuberculosis—Pott's disease, tuberculosis of the sternum and caseating tubercular glands of the neck. Next Dr. R. Gopalan presented a few cases of congestive heart failure. There was also a discussion on the management of congestive heart failure by the members.

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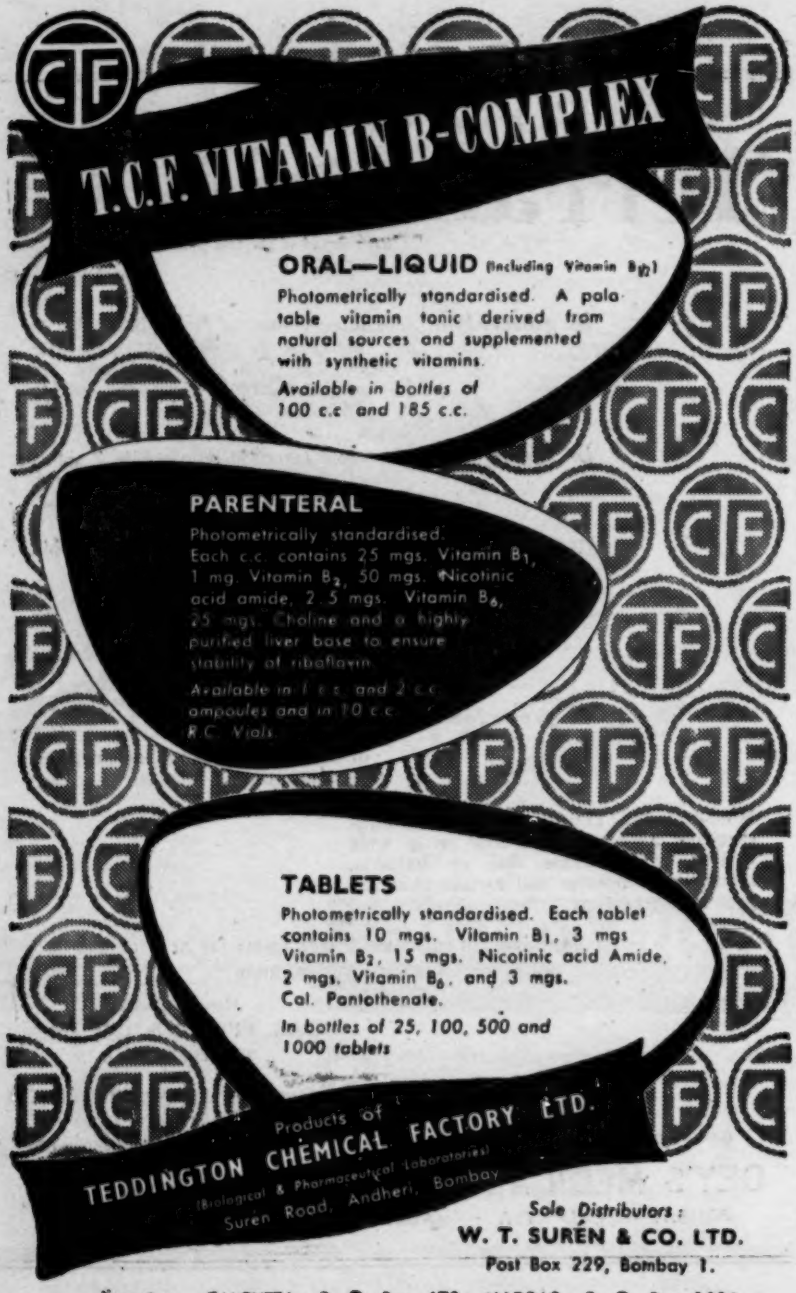
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[1] Britton C. J. C. (1950): Practitioner, 164, 458

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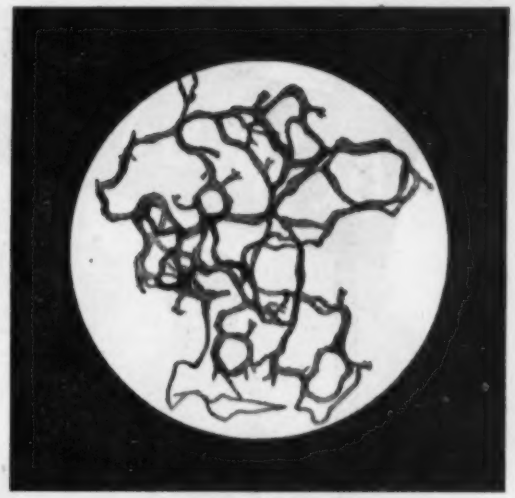

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Amer. Heart J., 1949, 37, 531.
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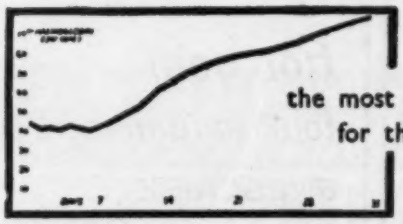

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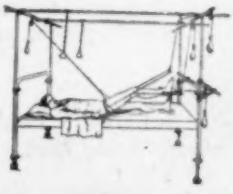

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